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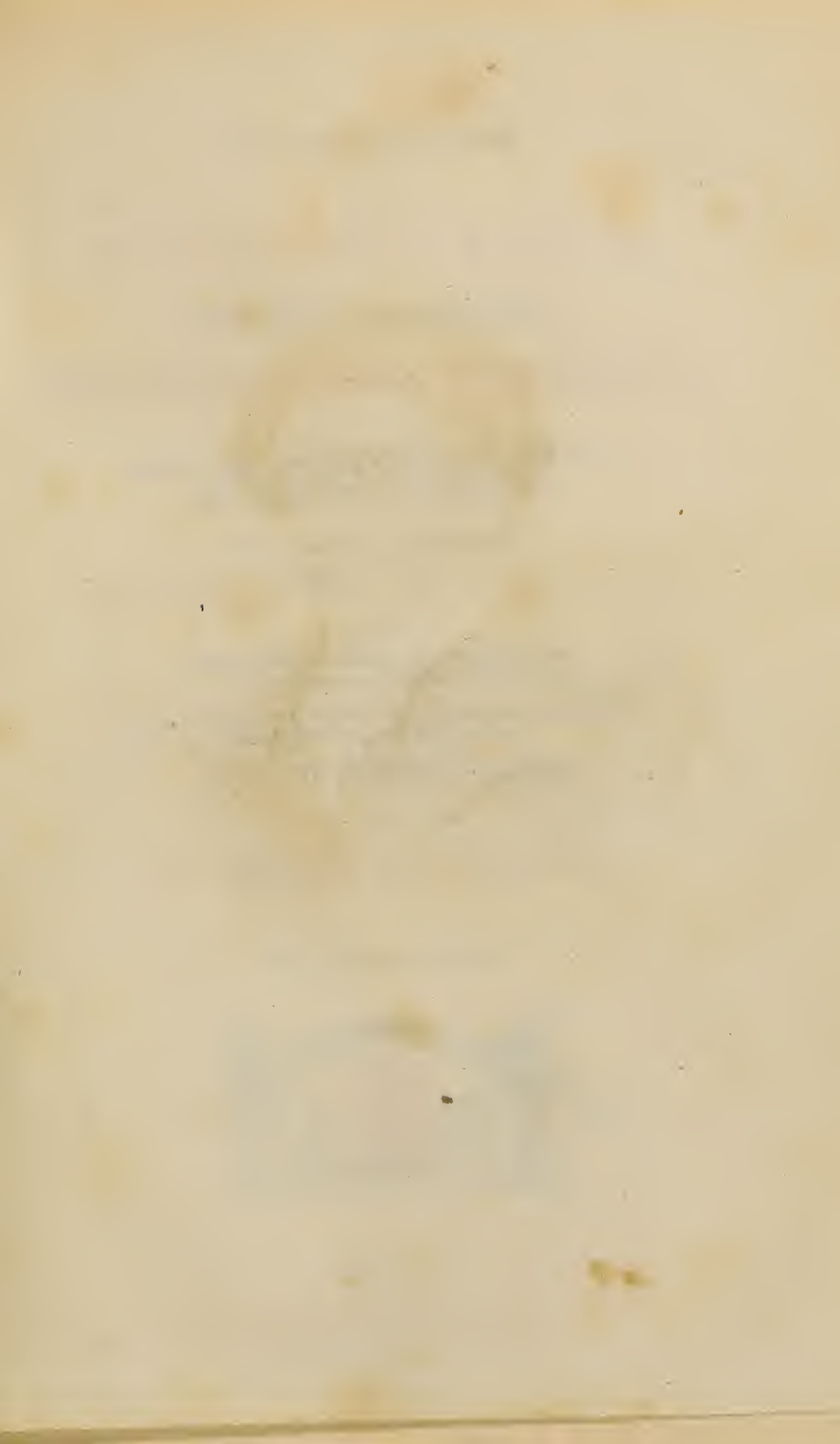
P E R S P E C T I V E,  
PRACTICAL GEOMETRY,  
DRAWING AND PAINTING.







*Charles Hayter.*







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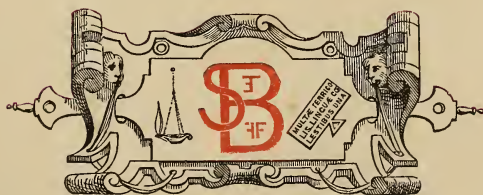
AN INTRODUCTION  
TO  
P E R S P E C T I V E,  
PRACTICAL GEOMETRY,  
DRAWING AND PAINTING;  
A  
NEW AND PERFECT EXPLANATION OF  
THE MIXTURE OF COLOURS;  
WITH PRACTICAL DIRECTIONS FOR  
MINIATURE, CRAYON, AND OIL PAINTING;  
IN A SERIES OF  
FAMILIAR DIALOGUES BETWEEN THE AUTHOR'S CHILDREN,  
AND LETTERS ADDRESSED TO HIS PUPILS.  
ILLUSTRATED WITH NUMEROUS WOOD ENGRAVINGS, FROM  
DRAWINGS BY JOHN HAYTER, ESQ.  
AND COLOURED PLATES.

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BY CHARLES HAYTER, ESQ.

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THE SIXTH EDITION.



LONDON  
SAMUEL BAGSTER AND SONS  
PATERNOSTER ROW

M.DCCC.XLV.

LONDON:  
PRINTED BY J. WERTHEIMER AND CO.  
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TO

SIR MARTIN ARCHER SHEE

PRESIDENT OF THE ROYAL ACADEMY OF ARTS, D.C.L., F.R.S.,  
ETC. ETC. ETC.

BY

WHOSE VALUABLE FAVOUR AND PATRONAGE

A FORMER EDITION OF THIS WORK HAS BEEN FOSTERED

THE PRESENT

GREATLY IMPROVED SIXTH EDITION

IS BY PERMISSION

DEDICATED WITH GRATITUDE AND PROFOUND RESPECT

BY HIS MUCH OBLIGED SERVANTS

THE PUBLISHERS.





## PREFACE.

How many persons, upon finding themselves possessed of the power of using a pencil for their amusement, or at least of the inclination to learn to draw, have been turned from becoming acquainted with the principles of Perspective, by the repulsiveness of the mode in which the necessary information has been presented.

Yet excellence as an Artist is not to be attained by any means short of a comprehension of the truths of this science—nor can any neglect its paramount claims, without danger of falling into frequent and glaring inconsistencies—nor without its aid, produce even a tolerable effect.

Perspective must be studied and mastered by all who desire to excel as Artists.

Is this science, however, really so difficult as it is represented? We affirm that it is not.

The Author of the present Volume found that it was not, when pursuing his successful career as a Teacher of Painting and Perspective Drawing; and he has left us here the results of his long experience, in a series of interesting intelligible Dialogues between his children, which familiarly explain the whole subject—initiating the reader, and conducting him from

subject to subject, in a manner at once delightful and obviously natural, and leaving him little difficulty to contend with, and no labour beyond the carrying out of Mr. Hayter's frequent and invaluable admonition, to practise every new lesson as it is learnt.

To give every possible facility to the learner, and at the same time to do justice to Mr. Hayter's instructive lessons on Perspective, a series of entirely new Drawings has been prepared for this edition by John Hayter, Esq., and engraved by Mr. Kirchner, in the finest style of wood-cutting:—and to illustrate our author's theory of the natural results of the combination of Colours as applied to miniature and general painting, highly finished coloured plates have been prepared after Mr. Hayter's originals. The typography of the work has also received the utmost attention; and, as a whole, the present SIXTH edition of this popular book will be found not only greatly improved, and beautified in appearance, but more than ever adapted to secure its amiable author's object—"the formation of a sound basis for either youth or maturity to build on, from which *Genius* may proceed with advantage."

PATERNOSTER ROW,  
December, 1844.

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\* \* The Publishers are indebted to the skill and experience of Owen Jones, Esq. for the production of the beautiful coloured plates which accompany this volume.

PERSPECTIVE EXPLAINED.



THE DIALOGUE.





# PERSPECTIVE EXPLAINED

IN A SERIES OF DIALOGUES BETWEEN  
THE AUTHOR'S CHILDREN,

GEORGE, ANN, ELIZA, AND JOHN.

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## PERSPECTIVE THE FOUNDATION OF TRUTH IN A PICTURE.

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### INTRODUCTION.

*Eliza.* My dear brother, when will you begin to teach us perspective? You know I do not love a state of *darkness*; and you have told me that a painter might as well be blind, as ignorant of this most important branch of his art.

*George.* Indeed, my dear Eliza, it is of the very first importance; and is rather the *main root*, or foundation of truth, in a picture, than a branch. I am very happy to find you so earnestly disposed to study it; and if sister Ann is at leisure, and John will be attentive, I will now endeavour to make you acquainted with all the necessary rules and principles. I trust you will not allow doubts, or critical objections, to interrupt the information I shall offer you.

*John.* Why, brother, you know I can draw, and yet I do not understand perspective. *What is it?* Shall I be able to draw better when I have learned it?

*Ann.* You know, my dear boy, you have always something to *copy from*; which, it is granted, you imitate prettily; but what would you do without a drawing ready designed to your hand? The “attention” which George has recommended, will be the best means of obtaining an answer to your question.

*George.* That is well observed: and I shall proceed—First, to point out to you the general and distinguishing character of PERSPECTIVE; which is, THE REPRESENTATION OF OB-

JECTS AS THEY APPEAR, AGREEABLY TO THEIR REAL FORMS, DIMENSIONS, AND VARIOUS DISTANCES; BY DRAWING OR PAINTING ON A FLAT SURFACE: for you know that paintings, drawings, and prints, are all produced on *flat surfaces*, and yet on such flat surfaces, *distance, height, width, depth*, and the various appearances of all sorts of substances, “even the thin air,” is perceived to bear so nearly the effect of reality, as oftentimes to deceive the imagination: and to produce this effect, *successfully*, a THOROUGH KNOWLEDGE of Perspective, and a very ingenious and judicious use of such knowledge is absolutely necessary. The EYE (the particulars of the construction of which you will learn when you study *optics*) is so wonderfully contrived, as to receive, at one view or action of sight, and comprehend, all the visible matter which may appear within a certain space (or *under a certain angle*, according to the technical term to be hereafter explained); producing a perfect idea of the *real forms* seen, by an association of lines and angles *totally different* from their absolute or geometrical measurements. Yet the *form* of a true and judicious perspective representation, will so perfectly agree with the knowledge conveyed by the absolute or geometric form, that the one will stand as an evidence, or test of the truth of the other. Thus: In viewing a long walk, or a street (which we will suppose to be level, straight, parallel, and uniform in the buildings), it will appear to *diminish* according to the distance, *converging towards a point* at the furthest end—thus, therefore, a PERSPECTIVE REPRESENTATION WOULD DESCRIBE IT—yet would the drawing preserve and convey to the mind a perfect idea of the geometric and real forms presented to the view. This, however, so very differently from the objects themselves, that there might be but one retiring, or converging level line, that of the horizon, in the whole drawing,—and no two retiring parallel lines, except such as were *really not so* in the objects of view, but actually diverging from the sight in the same degree as *real parallels* appear to converge to it:—for, all other lines that are *seen* parallel must be perpendicular lines, and parallel with the surface of the picture; all lines also that are parallel with the horizon must be drawn as *seen*.

*Now for an experimental proof.*—Go to the window, and look steadfastly through the square of glass which is directly opposite to your face (you know the glass is a flat surface, and must be understood to constitute what is called the *transparent plane* in perspective); now, if you can keep yourself stationary, within reach of the glass, you may trace, with a pen, *a proper perspective outline* of the scene or objects in view; and by first laying a thin wash of gum water, or isinglass, on the pane, you may trace the scene with a black, or rather *red* chalk pencil; and then placing a piece of paper over it, you may trace it off as an outline to make a finished drawing from.

*Ann.* But, brother, you must tell us how to keep the eye in one position, as I perceive at once the success of the operation depends on that.

*Eliza.* O sister, that may be contrived many ways!—I long to try to take a view by this method. I wonder painters do not use it: I really feel as if I wanted no further information on the subject.

*George.* *This* could not fail of truth for the *outline* of all *stationary* objects—but the *sun shadows* are continually changing as the day advances, while a true picture requires that every thing should be represented *as seen at once*, as when you look at a picture; which you could not accomplish without receiving instruction, which will follow in its proper place.—A very complete apparatus has been made, by which to take views in *outline* corresponding with this method; and is used where expedition, or a want of knowledge of art, makes it necessary: it may be called a “*Master-key*” to perspective, and is named, “*HAYTER’S PORTABLE PERSPECTIVE TRIPOD*,” which I have simplified and rendered very portable. But I directed you to the tracing on the window, only to *CONFIRM* your ideas on *this leading first principle*, that in every thing you draw, you are to conceive you are drawing, on a glass or transparent plane, *objects* which are supposed to be on the other side. But you are not to sit down with these contrivances, if you intend to become acquainted with the art of painting; as it will be absolutely requisite for you to learn all the elements, beginning with practical geometry (sufficient knowledge of which I shall

refer you to in due order), and leave all the *secondary* means of *picture-making* to those who will not acquire the art of doing without them.

*John.* What is meant by "*secondary means*"?

*George.* ALL COPYING, whether by measuring, tracing, squaring, or pouncing; and *all mechanical* aids in making copies of pictures; because an *original* is previously provided; so that all the study, knowledge, and labour which is required to produce an *original* picture, is already prepared to the eye and hand of the *copyist*.

*Ann.* Then engravers are but secondary artists?

*Eliza.* I believe, sister, this is too hasty a conclusion; for by what I have somewhere read on the subject, *engraving* (although dependent on some mechanical means to obtain a certain and correct outline of the subject of imitation) is one of the great departments of art, and may be as excellent, *in its way*, as painting itself; and such *good* engravings as are done from pictures which are less correct in colouring than in *light* and *shade*, may be so far improvements on the originals. Engravers consider themselves as "translators of pictures into another language," and claim the merit of improving on *many originals*, with advantage to the subject.

*John.* I beg pardon, sisters; but I think you should not talk about engraving now: it is a hindrance.

*George.* Now, to convince you of the great advantage of a regular acquaintance with the *Art of perspective*, please to observe, that architects, after they have drawn the geometrical plans and elevations of a building, can (by *due knowledge of this art*, united with a tolerably good taste for landscape drawing) give very true pictures of *intended* buildings or improvements *before they are begun*, making due allowance for the effects of what is called *Landscape-gardening*, and they often convey good hints for that.

*Eliza.* What! entirely without seeing them?

*George.* Yes, as perfectly as you could trace them on a *transparent plane*, after the whole is completely built and planted: and those architects who *thoroughly* understand perspective, can make out geometrical plans and elevations from

*correct* perspective pictures of buildings so truly as to enable them to erect exact copies of as much of the real edifice as is represented in the picture; for this plain and evident reason,—If a geometrical object presents the means of making a *true perspective* picture of it, such picture must contain the material evidences of the original geometrical elevation.

*Ann.* How delightful! What an art it must be!—but I cannot help thinking it very difficult.

*Eliza.* Why, there seems to be a kind of prophetic power in perspective, if one is enabled to shew the true picture of a place before it is built. I also have some serious apprehension of the difficulty.

*George.* Never fear, sisters. Attention and perseverance will surmount great difficulties; and *perspective being attainable by rules*, must not be classed among the greatest. I will do all in my power to make the whole as easy and pleasant as possible.

*John.* Then you know, Eliza, we shall be able to *prophecy* pictures without *tracing*.

*Eliza.* And yet, for my part, I have conceived a great partiality to this drawing on a glass; for while at the window I could imagine *the window frame to be a picture frame*, and all I saw beyond *appeared to be a PERFECT PICTURE*. Do come again and look, Ann; and if you take my idea, you will be delighted: for though the scene is not composed of the most picturesque objects, yet only consider it, as I do, a painting, and tell me if ever you saw a better?

*Ann.* Oh, Eliza, I almost envy you this step! It has now taken my imagination rightly. You may well call it a perfect painting, although the scene makes it a poor picture. Well, who could have thought we should ever feel so much pleasure in looking towards that dull street!

*George.* Now, sisters, if only a right idea of perspective has given you so much pleasure, you may fairly conclude that a right knowledge of it is worth the study; for to study we must proceed: and I hope you will never quit any subject or suffer me, till you *clearly* understand me. And let me entreat you to *follow* my explanations attentively, inquiring freely about what is passing; but do not lead on too fast by looking forward, as



that may tend to the sort of dispatch which must be considered more a desire *to get rid of a lesson*, than to become acquainted with it.

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#### ON GEOMETRY AND THE USE OF THE INSTRUMENTS.

*Ann.* Pray, brother, is not *practical geometry* the proper introduction to perspective?

*Eliza.* O, geometry!—the very word alarms me.

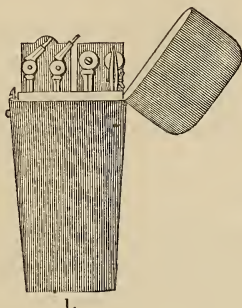
*George.* And pray, sister, did not the word *alphabet* once alarm you? and afterwards the words *grammar*, *French*, *geography*, *gamut*, etc.? Anticipation is as often erroneously awful as it is pleasing; possession is the test. Let the rudimental knowledge you already possess, teach you how to feel respecting the important addition we are endeavouring to make to your accomplishments. What say *you* to geometry, my brave John?

*John.* I do not intend to be alarmed at a word, I promise you. I suppose you will soon shew us the meaning of it:—What is Geometry?

*George.* Practically, it teaches the methods of drawing lines, polygons, circles, ovals, and all other measurable surfaces with truth, and proportionate to any scale you may find occasion to adopt. But it may be some considerable gratification to you to learn, that little more than the names of the general figures, and drawing the usual practical problems, will be all that is requisite to our progress in perspective. There will be *very* few mathematical calculations; and I promise you great pleasure in the results of your studies. *One* attainment, very conducive to your success in perspective drawing will be, the acquiring a ready use of the instruments: at the same time you will be gaining a knowledge of, at least, the *alphabet* of a *universal language*; which geometry may be considered, its principles being invariably the same everywhere, and at all times. Do you know, John, where to find the case of instruments, and the parallel ruler?

*John.* You know you *always* clean and lock them up safely in your drawer.

*George.* Take the key, and bring them here; and I hope you will never forget that you found them *clean* and *safe* when you first began to learn the use of them; for if you let your instruments get out of order, you will soon feel the inconvenience of it.

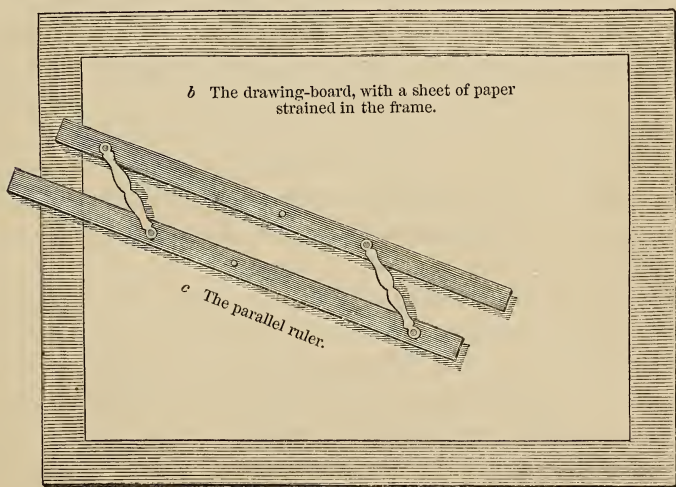


1.

*John.* Here are the instruments, brother (fig. 1).—Are we all to have instruments and drawing boards?

*George.* Of course; and I must observe, that genius may be much retarded for want of the possession and knowledge of these simple keys to the doors of art.

The framed drawing board (fig. 2) is made of various



2.

sizes, and may be had at the principal colour shops: it only requires attentive inspection to know how to put the paper on it. First, cut a piece of drawing paper,\* about an inch longer and wider than the panel: pass a clean damp sponge all

\* See a list of the *sizes* of drawing papers, at the end of the last Letter.

over the *back* of the paper (that side on which the maker's water-marks read backwards); then take out the panel, and place it evenly on the paper; lift up the paper and panel together; place them in the frame; press them well up to the front; replace the two bars behind; and, when dry, the paper is ready to draw on.

*Ann.* Is this sort of drawing-board absolutely requisite?

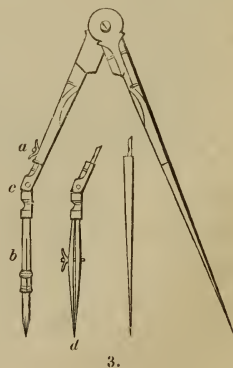
*George.* No; draftsmen paste or glue the edges of very large sheets, and lay them down on smooth boards; and this is the most usual method with architects and others for *large* drawings.

*Eliza.* Please to tell us the process.

*George.* First, observe that you must damp the *back* of the paper, and let the moisture diffuse till the sheet is *pliant*; then paste (with *strong* paste, quickly) about half an inch of the edge of the paper. Some artists double back as much of the paper as they mean to paste or glue; but I think it best, when pasting, to lay a flat ruler, as a barrier to the paste. If you want to use the paper instantly, you must *glue* the edge, as that will bear drying by the fire: the pasted edges will not, but must dry gradually. It is well to lay down paper for drawing on the evening previous to the day on which you wish to use it. Recollect to use glue quickly, and stick the part you glue to the board as you proceed; for glue will set, or *hill*, very quickly.

*John.* I hope the paper will soon be quite smooth—I want to see you begin drawing.

*George.* I must first explain the instruments, to which I beg you will pay great attention: now take the largest compasses (fig. 3.) out of the case, and by unscrewing that little screw at *a*, you may take out the steel leg (take care of it): then take that instrument out of the case which has a lead pencil in it, *b*, and place it in the compasses where you took out the steel leg, and turn the screw tight again;—thus we are





provided with the means of drawing the circular parts of geometrical drawing. Very highly finished instruments are made without the screw *a*, the parts being fitted to each other so nicely as to hold well together without its help.

*Ann.* That is very complete: will you tell me, brother, why there is a joint *c* in the pencil leg you have fixed in the compasses, as there is not one in the steel leg which you first took out?

*George.* Were it not for the joint, the pencil, or drawing pen, would lean too much on its side when a large circle is required to be drawn, and the line would of course be broad with the pencil, and the *pen* would not mark; but by bending that knee or joint you can draw to the full extent of the compasses, with the point perpendicular to the paper: thus geometry rewards the ingenuity of mechanics. Try it, and prove it.

*Eliza.* Here is another leg with a joint in it *d*; what is that at the other end of it, with a little screw?

*George.* That is a steel drawing pen, to place in the compasses after the pencil outline is correct; and you are therewith enabled to *ink in* all the circular parts of your drawing.

*John.* Then I suppose this long steel pen which has no joint is to *ink in* the *straight* lines?

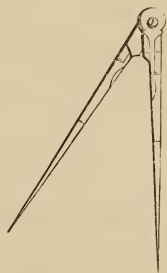
*George.* Very rightly supposed, John.

*John.* And what are those compasses for, which are without any joint or screw? (fig. 4.)

*George.* They are to take dimensions with, and are called *dividers*, and are nicely adapted to *set off* any number of equal parts, etc.

*Eliza.* What is this little rule for, which has so many lines and figures on it? I mean this with a joint?

*George.* You appear perplexed at this instrument: come, I shall soon relieve you; it is called the *sector*, and is particularly useful in many points of mathematical inquiry, but almost entirely useless in the *practice* of perspective: yet I hope you will find opportunity for learning the use of the line of *lines* on one side, and the line of *polygons* on the other, when you are far enough advanced in arithmetic.



4.

*Ann.* Where shall we find the proper explanation?

*George.* In the Encyclopedias, or “Kerby’s Dr. Brook Taylor’s Perspective”: there is also a cheap pamphlet on the use of the instruments.

*Ann.* And what use are we to make of this neat little thin rule, which has such a number of lines and figures on it? Will you please, indulgent master, to dispatch this intricate article as you did the sector?

*George.* Your request is granted, without any indulgence on my part; as *you* will only use it for a nice ruler. But I may tell you that the lines and figures are only proportionate scales; as, suppose you consider any one whole division on either of the lines, as an inch, foot, yard, pole, furlong, or mile, you will find the proportionate subdivisions at the end of that line; and on the other side is a line of inches, each divided *by ten* (or what is properly called decimally), and below that is a decimal scale, which, by means of the diagonal divisions at each end, exhibits the smallest tenth part that a draftsman can distinguish practically by lines.

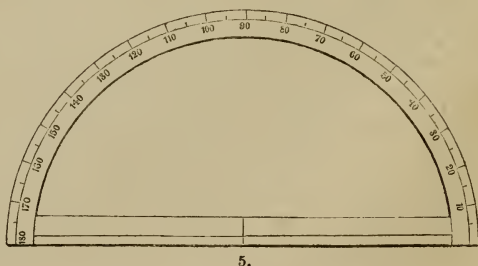
*Eliza.* I think we shall not, hereafter, be alarmed at intricate appearances, since your explanations are so very intelligible.

*Ann.* We were both cowards, Eliza; but George will pardon us.

*George.* Pardon, sisters! You know it cannot be long since I looked on these instruments with the same ideas of them as you seemed to entertain: there is nothing to pardon but a little impatience. Deliberate attention will render the whole as plain as that which I have already taught you.

*John.* Please to tell us what this half circle of brass (fig. 5.) is for, and then we shall know all the instruments.

*George.* It is called the *pro-*



*tractor*: it is used to find the number of degrees contained in an angle; thus—Ann, draw a right line, and place the straight edge of the protractor truly on it; then make a mark on the paper, at the top of the semicircular part of the protractor, at 90, and (without moving the protractor) make a mark on the line exactly at that little mark on the straight edge of the protractor, which divides it in half, and which is the centre of its circular part: now take it off, and draw a right line through the two marks you have made on the paper, and it will be exactly perpendicular to the line first drawn. From this you may remember that a right angle contains 90 degrees, or a quarter of a circle.\*

*Ann.* I see any other angle may be found in the same manner; do you comprehend it, Eliza?

*Eliza.* Not quite so clearly as you appear to; but George will favour me with another example.

*George.* Come, Ann, shew your sister how to find the angle of 75 degrees.

*Eliza.* I have it, George! It is only to mark at 75, as Ann did at 90, and draw the line to the centre.

*John.* Oh any body may do it; but I cannot tell of what use it is to know this.

*George.* I will tell you, John, one advantage you have gained by it; you know you are very attentive to conversation: now suppose you had heard any one say that the sun was about 30 degrees above the horizon (before I taught you this), could you have conceived what height the sun was?

*John.* No, brother.

*George.* Can you now?

*John.* I must consider a little: come, ask Ann and Eliza, and let me hear how they answer.

*Ann.* I think a line drawn from 30 on the protractor to the centre, would be in the same oblique direction from the level of the protractor, as the line from my eye to the sun, when it is 30 degrees high, or above the horizon.

*Eliza.* But the difference between a degree on this little

\* The student *must* practise this, if unacquainted with what the problem explains.

instrument, and the vast extent of that circle which the sun is supposed to make to the earth, or rather the earth to it, seems to me to bear no comparison.

*George.* The observation is allowable at present; but you must henceforth remember, that the three hundred and sixtieth part of the *smallest circle that can be drawn*, or conceived, is as much *one whole degree* of such circle, as the three hundred and sixtieth part of the *largest circle* imaginable in the vast immensity of space; and 30 degrees on the one would form precisely the same angle at the centre as on the other! Now, Eliza, for proof; take a large sheet of paper, and draw an angle of 30 degrees (let the point, or centre, be near the middle of the paper): now place the steel leg of the *pencil* compasses on the point of the angle, and strike the largest circle the paper will admit; now strike the smallest possible, and two or three intermediate circles, and you will observe, that the space between the two lines which forms the angle of 30 degrees, will be found to be exactly one twelfth part of the circumference of each of the circles, where they cross these lines; and, consequently, each is 30 degrees, because *twelve* times 30 is 360. You must each of you perform this experiment.

*John.* Now, brother, I understand how to conceive the sun's height when I hear the number of degrees mentioned; and I love the instruments the more I know them: but I always thought them very difficult things till you began to explain them. Come, will you please to explain the parallel ruler?

*George.* (Fig. 2, c.) It almost explains itself. Practice, with care and caution, will render it familiar to you. When you have drawn a line, and require another parallel to it, take care to keep the limb of the ruler, which you do not want to move, quite still, and firm to the paper with one hand, and move the other side, or limb of the ruler, upwards, or downwards, to the point required; then hold *that* firm to the paper while you draw the line; if this is not nicely attended to, you will lose the parallel, and confuse your drawing: indeed, the whole use of the instruments depends on precision, insomuch, that the words "*geometrical precision*," (strictly meaning, "ma-

thematical,") are the terms made use of to convey an idea of the utmost correctness. There are made parallel rulers *on rollers*, and many other useful instruments; but I will now go on with Practical Geometry—demanding your whole attention for a short space of time; and then, John, I will teach you to draw in perspective: you must keep your eyes on the diagrams, while I explain each figure, or give you what are termed

### THE DEFINITIONS OF GEOMETRY.

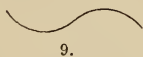
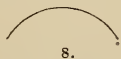
Fig. 6. This is only a single *dot* or *point*, and is the first term in practical geometry: it is to be conceived as without length, breadth, or thickness.

Dot, or Point.

Fig. 7 is a *straight line*, having length without reference to breadth or thickness, and which you may imagine to be a number of dots united.

*John.* But, brother, if dots mean points, as you have said, without "length, breadth, or thickness," how would they ever make a *line*?

*George.* That is a fair question, John; but you must allow the palpable dot for the present, although you are correct.



Figs. 8 and 9. These two figures are *curved lines*, having no straight part.

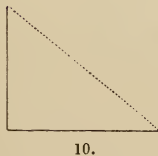


Fig. 10 is a *right angled triangle*, or an angle of 90 degrees.

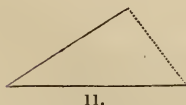


Fig. 11 is an *acute angle*, or less than 90 degrees.

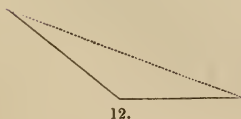


Fig. 12 is an *obtuse angle*, or more than 90 degrees.



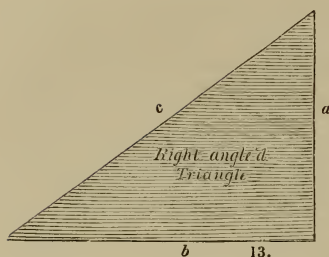


Fig. 13, *a*, is a *line perpendicular* to *b*, because it is at a *right angle* with it. Observe, that line is always considered perpendicular to a horizontal or level line, which is at a *right angle* with it; but a *plumb-line* is the original principle of a perpendicular, without any *material* exception to the object

of our pursuit.

*Ann.* Can there be *any* exception?

*George.* Yes, when a plumb-line is suspended near the side of a mountain, it will be attracted out of its vertical and proper perpendicular direction, towards the centre of gravity, by the mountain.

*Eliza.* In what proportionate degree, brother?

*George.* It will be too great a digression from the object of our present pursuit to answer your question properly; you will find it fully explained in the Encyclopedias, under the word "*Attraction*," which you will read at your own convenient time.

*John.* What is a plumb-line?

*George.* Tie your top-string to the peg of your top, and let it hang as a weight, and the string will be a plumb-line. You may have observed the bricklayer's building-rule, that has a line and plummet of lead: it is called the *plumb-rule*; by which they are able to prove the perpendicular of their work, which is a point of the utmost importance in building: the pavior's *levelling-rule* has also the *plumb-line* hanging perpendicularly over the centre of its level edge or *base line*.

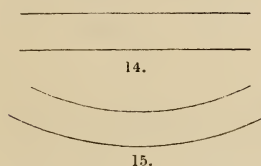
*Ann.* Then, as they are so very accurate in their works, I conceive we should not be less so in our imitations of them. Now I feel the force of your remarks on my first sketches; you used to say that the houses I drew were *falling down*.

*Eliza.* Why, all my little landscapes will shock me now; for the architecture is all leaning to the right hand, like writing.

*John.* Yes, I dare say it was the practice of "writing" which made you draw so sloping; and, I think, the best way will be to take more care in future.

*George.* Fig. 13, *b*, is a *horizontal line*, and represents a perfect level: it is the *base line* of this figure. (The term *base line* is properly applied to that line on which a figure is erected.) The bottom line of any picture is its "*base line*."

Fig. 13, *c*, is a *diagonal line*, because it crosses the figure at opposite angles, and in its direction may be considered the *oblique line*: that is the geometrical term for a straight line, which in vertical figures is neither level nor perpendicular; and oblique lines, on *any plane*, are such as are not perpendicular or parallel to the base line.



Figs. 14 and 15 are *parallel lines*: they always follow one another at equal distances. The two edges of the brass semicircle of the protractor are as parallel as those of the straight part.

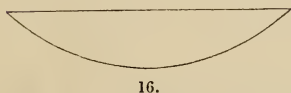


Fig. 16 is a *chord*, or *subtense*: it is the straight line that joins the two extremities of an arc, exactly as the string of an archer's bow, when strung: it is the *bow* which makes the title of "*archer*" proper.



Fig. 17. A *spiral line* is a curved line issuing from its centre, and continually expanding, and going off from it, at every turn.

*John.* I can make a *spiral line*, by rolling this narrow slip of paper round my pencil, and then letting it loose.

*George.* I like your observation, John; I shall soon direct you to the means of drawing one properly; let me first explain all the figures.

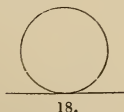


Fig. 18 is a *tangent*, which touches another line without cutting it.

*Eliza.* By the figure, it appears that the surface of the table would be a *tangent* to an *orange*; I wish you would make the experiment, brother.

*George.* The application deserves one; and we will divide it by cutting into four equal parts: the lines which pass through

the orange, in dividing it, will be *secants*, and are explained in our next figures.

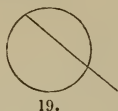


Fig. 19. A *secant* is a line that *cuts* or *crosses* a figure.



Fig. 20. is another example, shewing two *secants* through one figure.

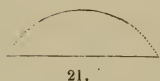


Fig. 21 is the segment of a circle.

SURFACES which fall under mathematical observation may be comprehended under three terms, viz.:—1st, the plain or flat: 2nd, the convex: and 3rd, the concave; but all surface whatever may be considered as geometrical: which (strictly speaking) means *measurable*.

The geometrical surfaces, with which you should be first acquainted, are generally known by the name of *polygons*, or figures of several sides; these may be brought under two denominations—1st, regular polygons, formed by any number of equal sides, and equal angles, within or without the circumference of a circle: 2nd, irregular polygons—which are as various as the number and lengths of their various sides on which their angles depend.



Fig. 22. The *trigon*, an equilateral triangle, having three equal sides and angles.

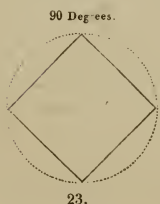


Fig. 23. The *tetragon*, or perfect square, with four equal sides: its four angles are—*right angles*.



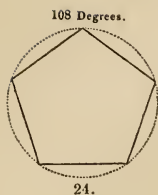


Fig. 24. The *pentagon*, or figure of five equal sides and angles.

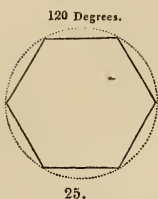


Fig. 25. The *hexagon*, or figure of six equal sides and angles; the sides of a hexagon are always half the diameter of the circle described round its angular points, which is called the *radius*, and means half the diameter.



Fig. 26. The *heptagon*, or figure of seven equal sides and angles.



Fig. 27. The *octagon*, or figure of eight equal sides and angles.

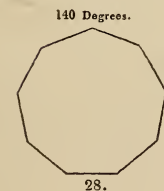


Fig. 28. The *enneagon*, or figure of nine equal sides and angles.

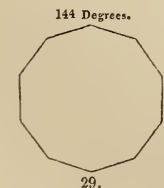


Fig. 29. The *decagon*, or figure of ten equal sides and angles.

Fig. 30. The *hendecagon*, or figure of eleven equal sides and angles.



Fig. 31. The *dodecagon*, or figure of twelve equal sides and angles.



When these figures are to be described within circles, all their angles must touch the circumferent line; but when produced proportionate to a *given* measurement for one side, the circumferent circle must arise, in some instances, out of the geometrical process necessary for finding the angles of such polygon: which I will teach you in proper course.

The number of degrees which is contained in one side of each polygon is marked, to shew you that the protractor (fig. 5) may be used to divide a circle into any number of equal parts, in the manner explained under its proper head—the use of the *protractor* (pages 10 and 11).

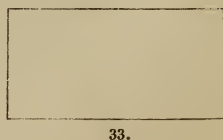
Triangular figures are distinguished by what is called the qualities of their angles; as a *right-angled* triangle (fig. 10), an *acute-angled* triangle (fig. 11), an *obtuse-angled* triangle (fig. 12), and the *trigon* (fig. 22).

The distinguishing names of four-sided figures are as follow:—

Fig. 32. The *square*.



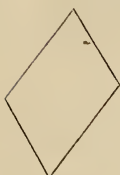
Fig. 33. The *parallelogram*.





34.

Fig. 34. The *rhombus*.



35.

Fig. 35. The *rhomboid*.



36.

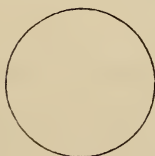
Fig. 36. The *trapezoid*, which has two opposite sides parallel, and the other two unequal.



37.

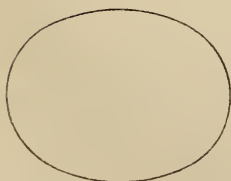
Fig. 37. The *trapezium*, having all its four sides and angles unequal.

The other two regular figures are—



38.

Fig. 38. The true *circle*.



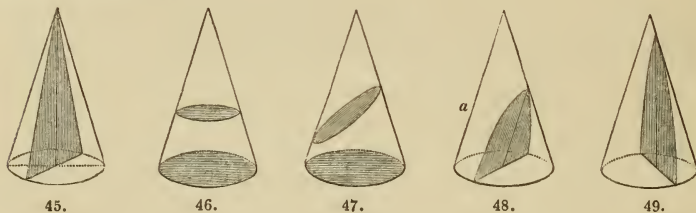
39

Fig. 39. The *ellipsis*.

The five principal solids are as under: the cube (fig. 40), the solid equilateral triangle (fig. 41), the globe (fig. 42), the cylinder (fig. 43), and the cone (fig. 44).



The sections of the cone are comprehended under the five following distinguishing names: the isosceles triangle (fig. 45), the circle (fig. 46), the ellipsis (fig. 47), the parabola (fig. 48), and the hyperbola (fig. 49), as shown by the shaded parts of these examples.



*Ann.* I quite understand the five solid figures, and *now* know what a *cone* is; but still I do not know enough of the conic sections which we sometimes hear spoken of.

*John.* What is the meaning of "section," brother?

*George.* A simple section is a straight separation of one part of a body from another by *cutting*. Thus in the section (fig. 45), the cone is cut perpendicularly into two equal parts or halves; and the flat surface, which is *represented by shade*, is an *isosceles triangle*. The second section (fig. 46) cuts the cone horizontally, or parallel with its circular base, and any such section must be therefore circular. Fig. 47, being an oblique section, must be an *ellipsis*. The *parabola* (fig. 48) is formed when the cone is cut parallel to its ascending side (see the line through the shaded part, which is parallel with the side *a*): and the *hyperbola* (fig. 49) is *any* section of a cone that terminates in the base of the cone, and is not parallel to the ascending side;

the example is *perpendicular*; but that is not the only section of the cone which is termed the hyperbola.

*Eliza.* Are we to draw these figures?

*George.* No; but I have explained them, so that when you hear them named you may understand all that *you* will stand in need of.

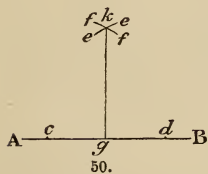
*Ann.* It is exactly what I wished to know of the words “Conic Sections.”

*John.* But I want to understand more of the five solid figures.

*George.* Our present pursuit does not require more; but I will explain the extreme distinction between the globe and the solid triangle. The globe contains the greatest solid quantity within the smallest superficial measure of external surface, while the solid equilateral triangle contains the smallest solid quantity within the greatest superficial contents of its exterior surface. This regular body has four equilateral sides, and but four angles, *equidistant from each other*—answering the question, How will you place four points at an equal distance apart? And now we proceed to the consideration of

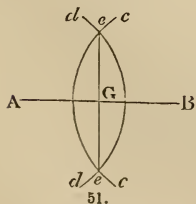
## PRACTICAL GEOMETRY.

*George.* I. Erect a perpendicular on a given line, as A B (fig. 50).



*Ann.* First draw the line A B, and mark it at *g*, where the perpendicular line is to be; the points *c* and *d* are made at equal distances from *g*, (the nearer A and B the

better); now take any convenient opening of the compasses, set one foot on *c* and describe *ff*, then with the same opening, with one foot on *d*, cross *ff* by the curve *ee*, producing the point *k*, then a line drawn from *g* to *k*, will be perpendicular to the line A B.



*George.* II. Divide a right line into two equal parts. This is yours, *Eliza*.

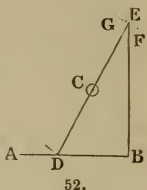
*Eliza.* I draw the line A B (fig. 51), and then, opening the compasses wider than half the length of the line A B, I set one foot on A and describe the arc *dd*; now I go to B, and draw the arc *cc*, crossing *dd* at the points

*e e*, then a right line drawn through *e e*, will divide the line A B equally at G.

*George.* III. Now erect a perpendicular on the end of a line.

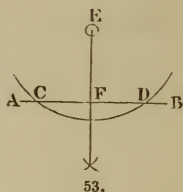
*John.* I can do it with the protractor, without following these directions—only marking my paper at 90 degrees, you know.

*George.* We can prove that hereafter. Come, proceed according to your example (fig. 52); draw the line A B, then open the compasses to about half its length, place one foot carefully on the end of B, and pitch the other foot down at adventure over the line A B, and mark it by C, on which fix one foot of your compasses, and then, with the other, mark the curves G F and D, then the line from D through C will cross G F, and produce the point E; and a line drawn from it down to B will produce the answer to my question.



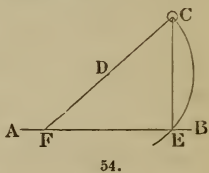
IV. Now observe how to let fall a perpendicular from a given point over a right line to that line. *AB* (fig. 53) is the right line, and the given point is at *E*; open the compasses to somewhat less than the space *AE*, set one foot on *E*, and describe the arc *CD*, producing the points *C D*, on each of which, with an equal opening of the compasses, make the cross curves below the line, to which from *E* draw *EF*, which is the line proposed.

53.



V. To let fall a perpendicular from a point nearly, or exactly, over the end of a right line; A B (fig. 54) being the given line, and C the given point: first draw an oblique line from the point C towards A, as at F; divide F C equally as at D, set one foot on D, carefully extending the other to C, then describe the arc C E, draw a line through C and E, and it is done.

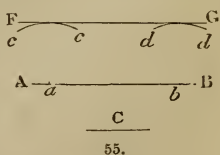
54.



VI. To draw one line parallel to another line, at a given distance asunder.

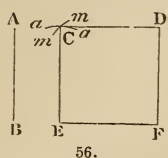
Draw the line  $AB$  (fig. 55), then take the given distance  $C$  in your compasses, and (any where) on  $AB$ , set one foot as at  $a$ ,

and describe the curve  $c c$ , and again on  $b$ , describe  $d d$ ;



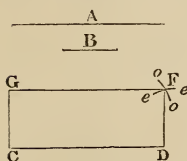


then draw the required line  $F G$  as a tangent to both,  $c c$  and  $d d$ —and it will be parallel to  $A B$  as required.



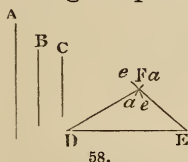
56.

VII. To make a geometrical square to a given measure. Let the line  $A B$  (fig. 56), of any length, be the measure of each side of the square, then draw  $E F$  the same length, and erect the perpendicular  $F D$  equal in length with  $A B$ ; now open your compasses to the given length  $A B$ , and with one foot on  $E$  describe the curve  $a a$ , and with the compasses opened to the diagonal space  $E D$  describe (on  $F$ )  $m m$ , crossing  $a a$ , and producing the point  $C$ ; then draw the lines  $C D$  and  $C E$ , and the square is completed.



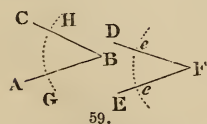
57.

VIII. To draw parallelograms to given measures. Let  $A$  be the length and  $B$  the width. First, draw the line  $C D$  (fig. 57) equal to  $A$ , then set up the given width  $B$  perpendicularly on  $C$ , producing  $G$ , and by describing the curve  $e e$  on  $D$  with the length of  $B$ , then (with the diagonal measure  $G D$  in your compasses, setting one foot on  $C$ ,) describe the curve  $o o$ , producing the point  $F$ , from which draw  $F D$  and  $F G$ .



58.

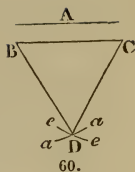
IX. To make a triangle by the given lengths of its three sides, as  $A B C$  (fig. 58). First, draw  $D E$  equal to  $A$ , then take the length of  $B$  in your compasses, and with one foot on  $D$  describe the curve  $e e$ , repeat the like with the length of  $C$  on  $E$ , describing the curve  $a a$  across  $e e$ , producing the point  $F$ , draw  $D F$  and  $E F$ , and the triangle is true to the given measures of its sides.



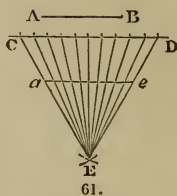
59.

X. To make an angle equal to one given.  $C$  and  $A$  (fig. 59) converge and meet at  $B$ , making the *given* angle; now draw  $E F$  equal to  $A B$ , and on  $B$  describe the curve  $G H$ , and with the same opening of your compasses, with one foot on  $F$ , describe the curve  $e e$ ; then take the space of the opening  $G H$ , and mark the space  $e e$  on the curve  $e e$  equal to  $G H$ , then through the upper  $e$ , draw the side  $D$  to  $F$ , and the angles are equal.

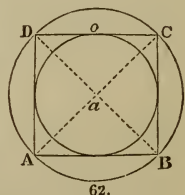
XI. To make an equilateral triangle to the given measure of one side. First, draw the line  $BC$  (fig. 60) equal to the given measure  $A$ , then with one foot on  $B$  describe the length of  $A$  by the curve  $a a$ , and on  $C$  by the curve  $e e$ , producing the point  $D$ , draw  $BD$  and  $CD$ , which completes the equilateral triangle.



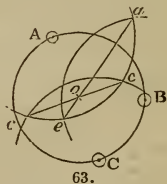
XII. To divide a given right line into any number of equal parts. First, draw a line, as  $CD$  (fig. 61), any greater length than the given line  $AB$ ; then set off upon it the number of equal parts required from  $C$  towards  $D$ , which determine the length of  $CD$ , as one side of an equilateral triangle; which must be drawn according to the foregoing directions (XI.): then with the given length  $AB$  in your compasses, and one foot on  $E$ , mark  $a$  and  $e$ , draw the line  $ae$ , and rule all the points on  $CD$  down to  $E$ , which will divide the given line as at  $ae$  equally, as required.



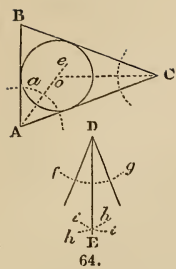
XIII. To describe a circle within and outside of a square. Draw the square  $ABCD$  (fig. 62), and the two diagonal lines  $DB$  and  $AC$ , producing the centre  $a$ ; then opening the compasses from  $a$  to  $B$ , describe the outer circle; now bisect  $DC$  at  $o$ ; take the space  $ao$ , and on  $a$  describe the inner circle, which is as required.



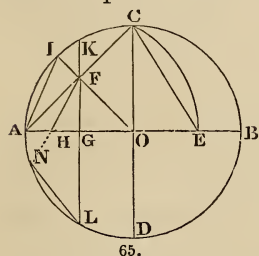
XIV. To describe a circle that shall pass through three given points, when not *all* on a right line: Mark your three points at pleasure, as  $ABC$  (fig. 63), now open your compasses to more than half the space between the two most distant points, as  $AC$  in this example; then on  $A$  describe about half a circle inwards, the same on  $B$ , producing  $e$  and  $a$ ; the same again on  $C$ , producing  $c c$ ; rule lines through  $cc$  and  $ea$ , and where they cross each other, as at  $o$ , is the centre of a circle which would pass through the three given points as required.







XV. To inscribe the largest circle possible within any triangle:—Draw any triangle, as A B C (fig. 64), *bisect* any two of the angles (see the angle D of the lower diagram) thus—set one foot of the compasses on D, and at any convenient opening describe the curve *fg*, and on those points where *fg* crosses the two limbs of the angle, set your compasses and mark *h h* from *f*, and *i i* from *g*, producing the point E, then the central line D E *bisects* the angle; follow this method on the angles of your original triangle, and where the two bisectational lines *a* and *e* cross, as at *o*, is the proper centre of the required circle.



XVI. To find the side of any regular polygon, not exceeding *twelve* sides, within a circle. First draw a large circle, and through O (fig. 65), the centre, draw the diameter A B, which divides the circle into *two equal parts*, then with the radius of the circle, and one foot on

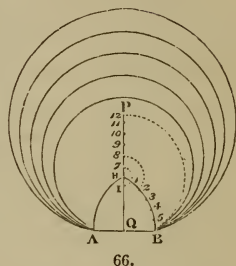
A, mark K and L, the line K L will be the side of an *equilateral triangle* to that circle; then A C will be the side of a regular square in the circle, as a polygon of *four sides*; next place one foot of the compasses on G, and extend the other to C; describe C E, and the straight line C E is the side of a regular pentagon, *five sides*; then the radius, or semidiameter, makes the hexagon, *six sides*. The heptagon is found in half the length of the line K L, as K G or L G, this is the polygon of *seven sides*. Bisect A C as at I, draw A I, that is the side of an octagon, or regular polygon of *eight sides*. The line N L is one-third of the arc L K, and consequently is the true side of a regular polygon of *nine sides*, called the “enneagon,” or “nonagon.” The decagon is found by the length of O E, or by the chord of half the arc C E, this is the regular polygon of *ten sides*, etc. Now to find the side of the hendecagon, draw F N; then the length F H answers for the side of the polygon of *eleven sides*. And the chord of half the arcs A K or A L,

gives the length of the side of a dodecagon, or polygon of twelve sides.

*Ann.* It puzzled me to look at this diagram till you explained it: but suppose I had a fixed measure for one side of any polygon—how should I proceed?

*George.* Only follow me through the next figure as attentively as in this, and you will not fail of an answer.

XVII. To describe any regular polygon, including twelve sides or less, to the *given length* of any *one side*. Let A B (fig. 66) be the given measure of one side; *bisect* it at Q, and raise the perpendicular Q P; now with one foot on A, and the other extended to B, describe the arc B H; then on B describe the opposite arc A H; then divide the arc B H into six equal parts, and number them as in the example: then on the point H, as a centre, with the compasses open H, 1, describe the first small semicircle, I, 1, 7, which produces the points 7 and I; making I the centre for a circle to pass through A and B, which would make the line A B a side of a *pentagon* to such circle; then taking H for the centre, and A B for one side, you will produce a circle which would contain a *hexagon* with A B as one of its equal sides. The points numbered on the perpendicular, are the centres for their polygons, and are found by placing one foot on H (as I, 7, was found), and extending the other to first 2, then 3, etc., describing the small dotted semicircles up to their points, as numbered on the perpendicular Q P.

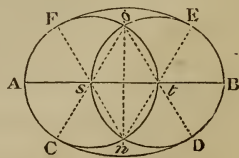


66.

*Eliza.* Then if I would make the given line A B, a side of an *enneagon*, I understand that I must make the point 9 (on the perpendicular Q P) the centre; and the space 9 A, or 9 B, the radius, or semi-diameter of that circle, which would contain such polygon.

*John.* And so, of course, with the other numbers on Q P.

*George.* XVIII. I will now show you how to describe an oval of a given length, without regard to width. A B (fig. 67)



67.

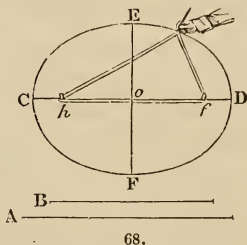
is the given length, which is divided into three equal parts, as at  $s$  and  $t$ ; then take the radius,  $s A$ , and on  $s$  describe the circle  $C A F$ , and on  $t$  the circle  $E B D$ . Now draw the lines  $n E$ , and  $n F$ , from the point  $n$ , through  $s$  and  $t$ ; and  $o C$ , and  $o D$ , from  $o$  to  $C$ , and to  $D$ , through  $s$  and  $t$  (the points  $F E C D$  are *found* by these diagonal lines). Now take the space  $n F$  in your compasses, and with one foot on  $n$  describe  $F E$ , and with the same opening on  $o$  describe  $D C$ , *the oval is made*.

*Ann.* If we are only bound to length, are we always obliged to divide into *three* equal parts?

*George.* Not absolutely *obliged*; but as a mere oval it is as agreeable an approach to the *true* ovalar form as you require; a *perfect oval* has *no part of a circle* in its circumferent line, and is termed an *ellipsis*.

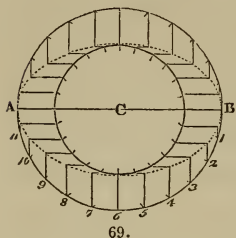
*John.* And pray, brother, how is one described?

*George.* XIX. In this way (fig. 68); which is a perfect and *universal* rule for every oval, of whatever given length and width. To describe a perfect ellipsis, whose *transverse* (the longest), and *conjugate* (the shortest), diameter are given, as  $A$  and  $B$ ; first draw the long diameter  $A$  at  $C D$ , then cross it *centrally* with the short diameter  $B$  at  $E F$ : they always *bisect* each other at right angles, producing the centre  $o$ . Now with your compasses take the space  $C o$ , which is half the transverse diameter, place one foot on either  $F$  or  $E$ , and mark  $h$  and  $f$  on the line  $C D$ .

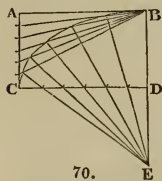


Now, John, get the deal drawing-board, that we may set up two strong pins or small nails at  $h$  and at  $f$ ; and we will pass a strong thread round the two pins, and put a third pin *temporarily* at  $E$  or  $F$ , tying it exactly tight in the form of the triangle  $h E f$ , or  $h F f$ . Now let us take away the third pin, and set up your pencil in its place, within the thread, keeping it uniformly tight by the regular pressure of your pencil, moving on steadily towards  $D$ ; and onwards through  $F$  and  $C$  up to  $E$ , and the line thus drawn will be as true an ellipsis as the nature of the materials and your care will admit of; *the principle is perfect*, and supersedes the necessity of applying to other

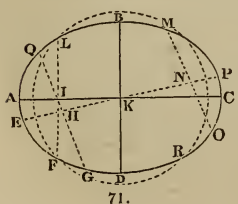
methods; but as the ingenious contrivance of producing a true result by the *intersection of lines* will be instructive, you shall have two different examples.



XX. To describe, then, an ellipsis of any given length and width by the intersection of lines, producing *ordinates*. First draw the length A C B (fig. 69): take the half of the long diameter as at C, in your compasses, and describe the largest circle; then with half the given short diameter on the original centre C, describe the inner circle; now divide the outer circle into 24 equal parts, then lay your ruler on the centre C, and (passing it successively on to each of the divisional marks on the outer circle), where your ruler crosses the *inner* circle, repeat the divisional marks upon it; then from every mark of the inner circle draw horizontal lines to the great circle, and perpendicular lines from all the marks on the *great circle* till they cross the first set of lines; the points through which the *true ellipsis* can be traced will be thus produced.



XXI. This figure exhibits a quarter of a true ellipsis; by which *method the whole* might be drawn. First draw A B (fig. 70) as half the length of an ellipsis, and let fall the perpendicular A C equal to half the width; then draw C D parallel to A B, and B D E parallel to A C, exactly twice the length of A C; now divide A C and C D into six (or any other number) of equal parts, and draw lines from each division on the line A C, all converging to B; and from E, across each division on the line C D, till each meets its correspondent, as in the example; then a curve drawn through the points thus found will be a true quarter part of an ellipse.



XXII. But to find the *centre* of a given oval, and its two *diameters*; you must first draw the two *parallel lines* Q G, and M O (fig. 71), in any direction, and any distance apart, within the given oval; *bisect* them at H and N, then draw the line E P through H and N;



*bisect* it as at K, which is the true centre of the oval. Now, on K describe a dotted circle, with a radius less than half the length, but greater than half the width, so as to intersect the oval as at F and L, R and M; then draw the line L F, and *bisect* it, which will give you I, and a line drawn through I and K will be the *long diameter*: then at K draw B K D parallel with L I F, and that is the true *conjugate* (or short) diameter: thus is the question answered.



XXIII. To describe a simple *spiral line*, first draw a right line, and divide it into any number of equal parts. On the centre A (fig. 72) describe R L, and on L describe from R to second L; return to A as a centre, and describe the half circle I second L; now shift your centre to L, open to I, and describe the half circle below the line to the second I; again, A is the centre for the next half circle above the line, joining second I, and describing back to P; then from P to N below the line, with the centre at L; then from N back to S above the line, with the centre at A; now go to L as a centre, and describe from S to E below the line: so much for *the example here*—but you might go on to the utmost extent of your means, simply by making A and L the alternate centres, and gradually enlarging your radiuses so as to join with the last point of the last half circle.

*John.* Is the Ionic volute done so?

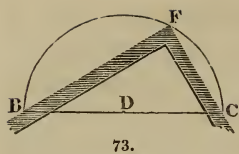
*George.* Yes, inasmuch as it is formed by parts of circles; but instead of half circles it is brought *nearer* the truth by quarters of circles, of which you will know more when you draw the five orders of architecture.

*Ann.* You said, *nearer* the truth: are not the volutes which we see on the Ionic capitals *quite true*?

*George.* Not unless they are drawn on the principles of the ellipsis, which has no part that could be described by compasses on a centre, and I know of no other given rule than the one I have hinted at.

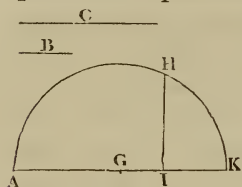
*Eliza.* If a rule could be discovered by the beautiful volutes of some of the natural sea shells, that must, I think, be perfect.

*George.* XXIV. I give you credit *for that*, Eliza; but I will



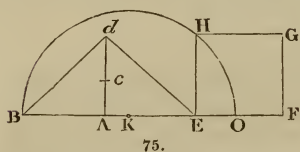
73.

proceed to teach you how to make a right-angled instrument as a temporary setting-square (see fig. 13). Describe the semicircle  $BFC$  (fig. 73) on the right line  $BDC$ : then lines drawn from  $B$   $C$  to any point on the semicircle will describe a right angle, as  $F$  in this example. This is a practical illustration of Numbers III, V, and XIII. By means of this right-angled instrument you may describe a circle without compasses (when its diameter is shorter than the sides of your square), by setting up two pins firmly on  $B$  and  $C$ , and moving the angle  $F$  of the setting-square steadily round, touching its course with your pencil sufficiently to trace the line, while the two sides of the instrument are kept close to  $B$  and  $C$ ; then turn over the setting-square, and repeat the same on the lower half of the circle.



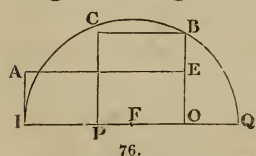
74.

XXV. We will now find a *mean proportional* between two given right lines. Unite the given lines  $CB$  (fig. 74) into one right line, as at  $AIK$ . Bisect  $AK$  at  $G$ ; on  $G$  describe the semicircle  $AHK$ ; then at  $I$ , where  $C$  and  $B$  join, forming the base line  $AGIK$ , erect the perpendicular  $IH$ , which is the mean proportional sought for.



75.

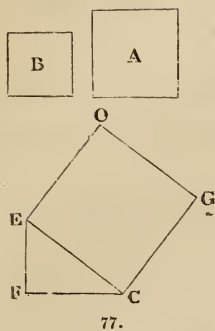
XXVI. To make a geometrical square equal in area to a given triangle, as  $BdE$  (fig. 75), you must let fall a perpendicular from  $d$  to  $A$ , bisect  $Ad$ , and join the half of  $Ad$  to  $BE$ , as at  $O$ ; bisect  $BO$  at  $K$ , and there describe the semicircle  $BHO$ ; then at  $E$  erect the perpendicular  $EH$ ; and that is the length of one side of a square equal in area to the given triangle, as required.



76.

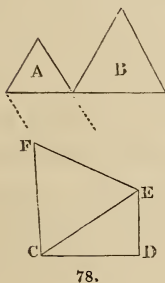
XXVII. To make a geometrical square equal in area to a given parallelogram  $AEOI$  (fig. 76); unite the length of the end  $EO$  to the base line  $IQ$ , extending to  $Q$ ; bisect  $IQ$  as at  $F$ ; there describe the semicircle  $ICBQ$ ; then carry

up the line  $O E$  to  $B$ , and  $O B$  is the side of the required square.



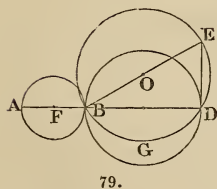
77.

XXVIII. To make a geometrical square equal in area to two variously sized given squares, or to *any* two given squares ( $A$  and  $B$ , fig. 77, being the two given squares), first, put one side of each of the given squares together, forming the *right angle*  $F$ ; then draw the diagonal line  $E C$ , which will be one side of the square sought, as  $E O G C$ . This is the famous 47th Theorem of the first book of Euclid's Elements.



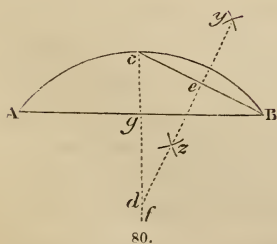
78.

XXIX. To make an equilateral triangle equal in area to two given equilateral triangles, as  $A$  and  $B$  (fig. 78), join one side of each, so as to make the *right angle*  $D$ ; then draw the diagonal  $E C$ , which is one side of the triangle  $C F E$ , the figure required.



79.

XXX. Suppose two circles be given, how shall we make another equal in area to both? First, form a right angle with a line drawn through the two given diameters, as  $D$  (fig. 79); draw the diagonal  $B E$ , and *bisect* it at  $O$ ; then will  $O$  (with the radius  $O B$  or  $O E$ ) be the centre for the circle required.

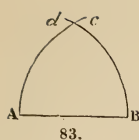


80.

XXXI. To describe a *scheme* arc to any given length and height. First, draw the given line  $A B$  (fig. 80) as the *chord* of the required arc; *bisect*  $A B$  as at  $g$ , and there set up  $g c$ , the given height of the arc required; then carry the perpendicular  $c g$  down to  $f$ : now draw the chord  $c B$ , *bisect* it by the cross curves  $y$  and  $z$ , drawn

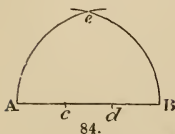






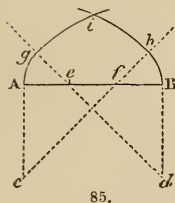
83.

XXXIV. The simple Gothic arch is the *equilateral* triangle. Draw the base or span A B (fig. 83) straight; then on A describe  $d$  B, and on B describe A  $c$ .



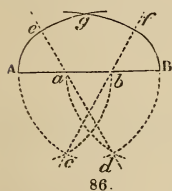
84.

XXXV. A Gothic arch of a wider span than the foregoing. Divide the line A B (fig. 84) into three equal parts as  $c$  and  $d$ ; take two parts for a radius, and on  $c$  and  $d$  describe the arches  $e$  B and  $e$  A, as in the example.



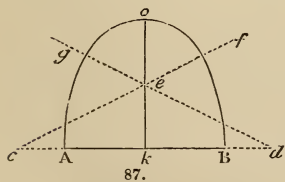
85.

XXXVI. Another form of a Gothic arch. Divide the line A B (fig. 85) into three equal parts as at  $e$  and  $f$ ; let fall perpendiculars from A and B down to  $c$  and  $d$ , the length of A  $f$  and B  $e$ ; draw a line from  $c$  through  $f$  producing  $h$ ; repeat the like from  $d$  through  $e$  producing  $g$ ; then on  $e$  describe A  $g$ , and on  $f$  describe B  $h$ , and on  $c$  describe  $h$   $i$ , and on  $d$ ,  $g$   $i$ ; and it will complete the Gothic arch required.



86.

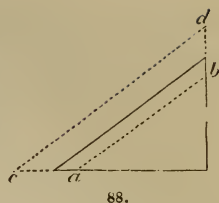
XXXVII. Another Gothic arch. Divide the line A B (fig. 86) as before into three equal parts; then with the radius of two parts describe the two equilateral arches below the line whose points are  $c$  and  $d$ ; draw the line  $c$   $f$  through  $b$ , and  $d$   $e$  through  $a$ , on  $a$  describe A  $e$ , and on  $b$  describe B  $f$ , on  $c$  describe  $g$   $f$ , and on  $d$  describe  $e$   $g$ ; and the desired arch is completed.



87.

XXXVIII. To describe an elliptical arch on its shortest diameter, —draw A B (fig. 87), erect the perpendicular  $k$   $o$  the height of the arch; bisect  $k$   $o$  as at  $e$ ; then with one foot on  $o$ , with the opening  $o$   $e$ , mark, by small curves, the points  $g$  and  $f$ , draw lines from  $g$  through  $e$  down to  $d$ , and from  $f$  through  $e$  down to  $c$ ; then  $c$  and  $d$  are centres for B  $f$  and A  $g$ ,  $e$  the centre for  $g$   $o$   $f$ ; and the arch is finished.

XXXIX. To make any triangle proportionable to another—rule a line to the size required, parallel to either side of the given triangle, as  $a b$  or  $c d$  (fig. 88).



88.



89.



90.

XL. To copy by *reticulation*, is to divide the original drawing into a sufficient number of equal cross lines at right angles (figs. 89 and 90); this is generally done with fine thread on paintings; but the surface on which the copy is to be made is either ruled with pencil, or marked by a chalked line. If *very transparent* tracing paper be well marked by ruled lines, and placed closely over the subject to be copied, it preserves the surface untouched, and answers well enough. When both are completely squared, they should be numbered at the top and one side, to prevent any mistake in the outline, the process of which is to repeat every shape of the original on its corresponding square of the copy, till the whole outline is completed; which, *if truly done*, will, *so far*, ensure a successful copy.

*John.* Ah! this is the way engravers get such correct copies; this explains the word "*squaring*," which you spoke of at the beginning of perspective as one of the "*secondary means*."

*Ann.* Is this the end of Practical Geometry?

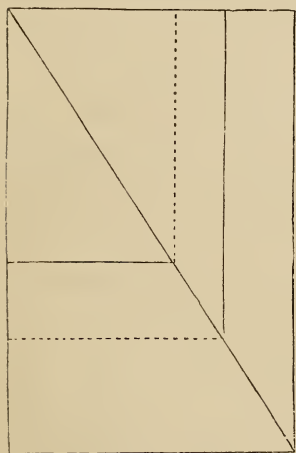
*George.* I may call it *the alphabet* rather than the end.

*John.* Must we remember it all?

*Eliza.* We have learned how to read it at any rate, and can refer to our problems, as we do to our dictionaries and maps occasionally.

*George.* And questions which will often occur you will remember, as well as you do your language.

Whenever you would make a small copy of a picture, divide the original by whole numbers, so that the copy may measure exactly one-half, one-third, fourth, fifth, sixth, seventh, or eighth, etc., part of the original, both in height and width; that the proportions may be the more easily compared.



91.

But should it be required to copy some particular length or width, the proportion to the original may be perfectly obtained, by drawing a diagonal *right line* (fig. 91) on the original, with a piece of fine twine, or thread, from one corner at the top, to the opposite corner at the bottom; then set up the given length from the bottom, parallel to the side, or width from the side, parallel to the end, till either touches the diagonal, and from *that* point the corresponding width or length will be truly determined.

*Ann.* Has the triangular figure (fig. 73), any other use than what you explained in No. XXIV.?

*George.* One of its angles is made a correct right angle, for the purpose of drawing right angles without the geometrical process.

*John.* Then why did you not explain this before? We could have done all the right angles instantly, without so many A's and B's.

*George.* Yes; but then you would not have known how to make or *prove* this instrument.

*Eliza.* What is its diagonal side for, and why is one side of the right angle longest?

*George.* If the three sides are proportionably made to measure three, four, and five inches, feet, yards, etc., the squares of the two shortest sides added together, are equal to the square of the largest, or diagonal side.

*John.* What do you mean by the *square* of a side?

*George.* Multiply the side three inches by three, and that will be 9, or the *square* of three; then multiply four by four, and you have 16, which is the *square* of the next shortest side: add them together, and they make 25. Now *square* the longest side 5, and that will also produce 25, which stands as a general rule, that the *square* of any diagonal (or longest side) of a right-angled triangle, is equal to the united *squares* of the two lesser sides: turn to No. XXVIII., and you will find it proved. By this rule, builders begin to set their large framing at *right* angles (such as the first timbers of roofs, which are termed plates); and persons drawing plans, prove the truth of their proceedings thereby.

*John.* I wish, brother, you would shew me how they make use of this rule.

*George.* I will give you one instance: suppose a *jointed two-foot rule* to be two pieces of timber, 12 feet long instead of so many inches; and you wish to lay them down exactly at a right angle: first, open the dividers to 5 inches (supposed feet); then lay the rule on the table, with its two limbs as nearly as you can at a right angle, and place one foot of the dividers exactly at 3 inches from the centre of the joint, down one limb of the rule, and move the other limb till the other leg of the dividers will touch the point, which is four inches from the centre, and the angle will be right. This one right angle, thus found, is a rule for the rest of their operations, as far as relates to the square, because their opposite sides must be parallel, which is explained in your examples Nos. VII. and VIII. of Practical Geometry, figures 56 and 57: (the numbers 6, 8, and 10 feet, are generally the builders' guide, because their *ten-foot rod* proves the

diagonal of 6 feet and 8 feet). Endeavour to *complete* your knowledge of geometry; for a *smattering* of any art or science will only pass with the ignorant, and must expose you to the ridicule or contempt of the proficient. Knowledge of this nature is for use, not show; and every step one takes in geometry leads to an end so delightfully clear, that the student seems to feel *as if he had always known it*.

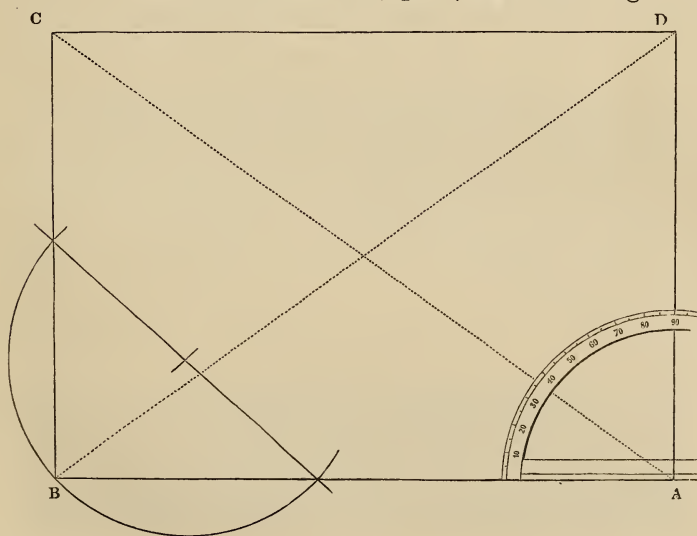
*Ann.* Can we begin perspective now?

*George.* Yes, by the help of No. III. of our Practical Geometry; for you know, sister, it will be requisite to have a right-angled figure, or parallelogram, to draw our designs in.

*John.* I can do that by the *protractor* now, if you will tell me how long and how wide it must be; it is exactly our example VIII., which I could do with the right-angled triangle now; but I will use the *protractor* to fulfil my promise.

*George.* Come, then, draw the figure  $3\frac{1}{4}$  inches long and  $2\frac{1}{4}$  inches wide; and explain your work as you proceed, in a clear manner.

*John.* I first draw a line A B (fig. 92)  $3\frac{1}{4}$  inches long; then



92

I shall set the straight edge of the protractor on that line, very

even, and with the little mark at the centre of it exactly to one end of the line; then I shall make the mark at 90 degrees, as you told us, and draw a line through it, to that end of the base line whereon I placed the centre of the protractor, which line I must mark exactly  $2\frac{1}{4}$  inches long—that makes one corner, you know: now I have only to mark the length  $3\frac{1}{4}$  inches from the top of the perpendicular I have drawn, and the width  $2\frac{1}{4}$  from the point of the other end of the *base line*, and draw the other two sides to the mark thus obtained, to complete it. (See figure 92).

*Eliza.* Well done, John.

*Ann.* I am delighted with it.

*George.* Now to prove the truth this right-angled figure, the two diagonal lengths, A C and B D, must be equal.

*Ann.* This is taught us by the *diagonal measure* used in our Nos. VII. and VIII.

*George.* You have now, I perceive, vanquished your “*terror*” at the sound of the word “*Geometry*,” and it gives me great pleasure to be able to pay you *all* the fair compliment of my very sincere thanks for your cheerful attention, and for the proofs you have evinced of my success as a teacher.

*John.* It is all easily enough understood, but then it is *so tedious* to draw them.

*George.* My dear brother, as the love of play and light amusements gradually subsides, you will find the benefit of knowledge fully worth the labour and application it requires; you have already proved how ignorance skulks away as intellect advances in power.

We have now laid a sufficient foundation for our progress in Perspective.

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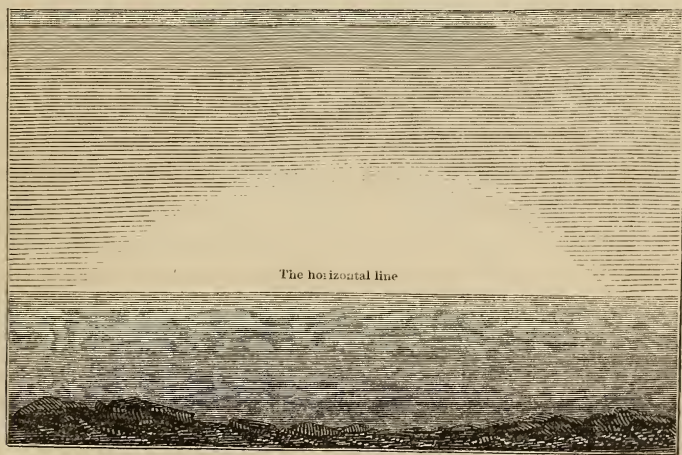


## PRINCIPLES OF PERSPECTIVE.

The *youthful* reader is to bear in mind, throughout the following explanations,—that the words “Object of study,” “Scene,” or “Subject,” relate to *real nature*, not to the pictures, or drawings, they may undertake to copy; as, in such *examples*, all the laws of perspective are, or should be, complete to their hands.

### ON THE HORIZON OF A PICTURE.

*George.* Now let me remind you of the rule laid down in the first part of our conversations,—that this outline or limit of the picture (fig. 92), must be conceived to be the size of an *aperture*, through which you view the object of your study (I mean by this not a *picture*, or *drawing*, but a real scene, or object of nature); and the glass surface, supposed to cover this aperture, is always to be understood as the *transparent plane*, on which (were your eye *stationary*) the drawing might be made a perfect outline: and, in drawing the ground plan and elevations preparatory for a perspective drawing, this transparent plane is always represented by a line called the *section line*, which will be further understood in proper course.



Now, on viewing the diagram (fig. 93), you may imagine a level surface extending from the *base* line to the utmost visible

distance: suppose it a smooth sea, if you please. The line which appears to meet the sky is called the **HORIZONTAL LINE**, and must be as high up in the picture as the spectator's eye; for the one *always* determines the other. In drawing landscapes from nature, the height of this line is determined by the horizon itself; because, had you the *transparent plane* really set up to sketch on (keeping your eye still, and at a proper distance from the glass), you would mark the horizon on the glass exactly and invariably, so nearly level with the eye, as to admit of no practical exception. This will be fully proved in its place.

*Ann.* As pictures are made of so many various dimensions, I should like to have some proportionate rule for the height of the *horizontal line*.

*George.* About one-third the height of the picture, or rather more, seems to be the most general rule for *level* subjects; but you are not confined to that proportion, as it may be sometimes proper to deviate from it.

*Eliza.* How are we to know when to make the *horizontal line* higher or lower than one-third up the picture?

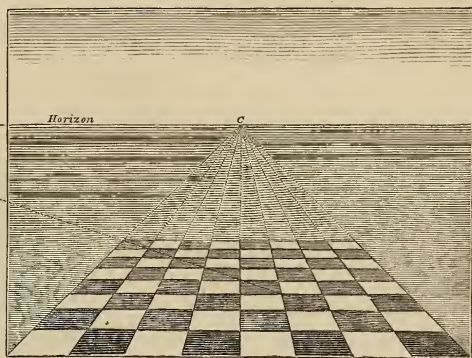
*George.* When you take a view from (or *design* one as if from) an *eminence*, you must, consequently, have a high horizontal line, in conformity with the rule first given for its height (that of the *eye*); and if you make an *eminence* the object of your view or invention, from an assumed or really *level station*, you must by the same rule have a low horizontal line. The antique, and all public statues of great and noble characters, being generally placed on elevated pedestals, and viewed from level stations, must of course have low horizons, as also whole-length portraits of distinguished persons. *Judicious artists* provide for this in their painting-rooms, by having a platform and high chair, for the purpose (while painting the head) of setting their subjects as high as if they stood for the whole figure, conformably to the integrity of perspective; that is, agreeably to the horizontal line of the picture. But subjects of familiar life may perhaps be the better characterised by a higher horizon. Genius must digest all rules, but should *never* attempt to proceed without the knowledge of them.

*John.* Now, if I were to draw the likeness of *my little dog*, I must have a high horizontal line to the picture ; because my eye must be considerably above him, unless, indeed, I placed him on the table, which, you know, is not a proper place for a dog ; but the portrait of a horse, or an elephant, would have a low horizon, inasmuch as their height is above the level of my eye. Am I right, George ?

*George.* You have comprehended me most happily. Such active and proper application of what I have taught you is a proof of your attention.

*Ann.* I have seen some very strange-looking prints, in which (what I now understand to be) the *horizontal line* was almost at the top of the picture, and one might see over the tops of houses, and even partly down the chimneys, and over a vast extent of country : what name do you give to this sort of view ?

*George.* It is called a *bird's eye* view (fig. 94) ; because the height of the *eye* is considered, in such pictures, to be inaccessible to any eye but that of a bird high in the air ; by which only



94.

such an extensive view can be obtained. This sort of pictures is rather descriptive, and the chief pleasure

they give is information : they convey a tolerably correct idea of both plan and elevation, in one piece, and are adapted to explain the positions of fleets or armies, or the general view of an estate or fortification. Palaces, and other public buildings, are thus represented occasionally.

*John.* I hope, brother, you will draw us a specimen of a bird's-eye view.

*George.* You will find one in the perspective view of the chess-board (fig. 94).

Now be *very* attentive; and, instead of 64 *square inches* (which admit to be the real dimensions of the *chequer-board*), you must consider them so many fields, each a *hundred yards* square: let this fix the scale of proportion with regard to the height of the *horizontal line*; and you will find the eye at *c*, exactly 400 yards above the base line, or level ground, which is certainly a height inaccessible to any eye but that of a bird.

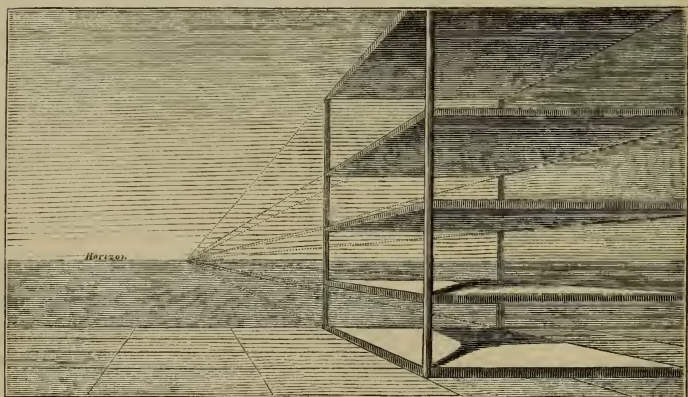
*Eliza.* Or a *balloonist's* suppose we new name it, since balloons have, in all probability, rivalled the utmost height of the eagle.

*Ann.* The thought is *a-propos*: but the old name is established; and, as it conveys the proper idea, need not be changed. We must all thank you, brother, for your very satisfactory explanations.

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#### ON THE APPARENT INCLINATION OF LEVELS TO THE HORIZON.

*George.* Now that you seem to comprehend the *horizon*



95.

(fig. 95) as the utmost visible line of level land, or of water, you must also take for a rule, that *all level planes* (such as floors, steps,



tables, shelves, ceilings, etc.) appear to tend to the horizontal line of the picture, as directly as level land or water. In the diagram are represented five *level planes*, which you may call broad shelves or floors, and their undersides ceilings: observe, they all converge towards the *horizontal line*, although they are representatives of *parallel surfaces*; two of which are below, and three above the horizon: and were their breadth to be continued to the utmost extent of visible distance, their retiring edges would all appear to unite in *one point* on the horizontal line, according to the lines in the example.

*Eliza.* This is very clear, brother: now will you tell me the proper name of the *point* to which all their retiring edges would converge?

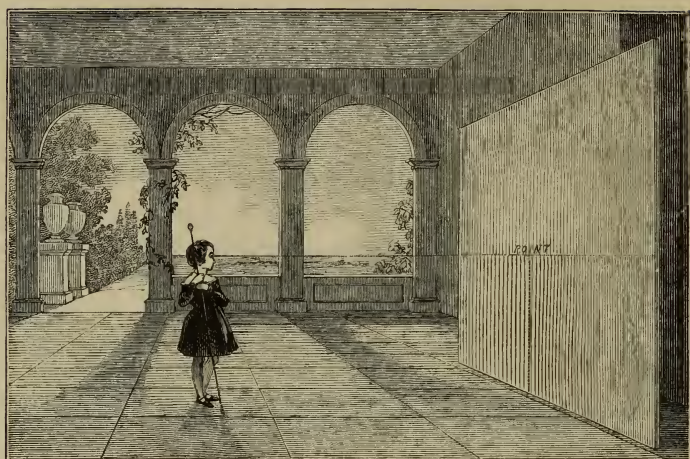
*George.* It is the POINT OF SIGHT; because the eye which could see the five level planes just as they are drawn, must be exactly *opposite* that point.

*Ann.* Let me understand you clearly. Is this point to be considered as in the picture, and on the distant horizon? or is it placed there to represent the point which falls directly *opposite the eye* of one viewing the scene?

*George.* The large white surface in fig. 96, which represents a plain canvass to be painted on, explains the matter at once; there the boy's eye, or *real point of sight*, is in its proper place, and the nominal *point of sight* properly placed on the canvass.

*John.* That makes it very clear.

*George.* Suppose you go to the *transparent plane* (the window) and fix yourself steady, as if you would trace on it the scene before you,—there would be *one point* of the glass you look through exactly level with your eye; and the continuation of that *point* by a *level line*, right and left, would be the proper *horizontal line*. But this particular point must fall precisely on that part of such line, where the ray or direct line of sight would form a *right angle* with the glass, so as to be exactly perpendicular to its surface and to your eye; and the ray of sight, thus determining this point, is called the *principal visual ray*; which you will be well acquainted with when you begin to



96.

draw in perspective. Therefore, as all visual rays proceed *from* the *eye*, and *not from the horizon* of the scene, the *point* thus marked must be considered to be *OPPOSITE the eye*; and it is to be marked on the horizon, only because it is impossible to describe the real situation of the eye, which must always be at least *the length of the picture* distant from it, as will be further explained as we proceed.

*John.* I observe, brother, you sometimes say *horizon*; and at others, *horizontal line*: what is the difference?

*George.* All drawings of perspective representations must have a *horizontal line*: but there are many pictures wherein a view of the natural *horizon*, or utmost distance, cannot be expressed: such as architectural views, interiors, caverns, woody scenery, mountainous distance, and perspective descriptions of machinery; the strict distinction therefore is, that the *horizon* is the real object, and the *horizontal line* is a line level with the eye, drawn on the picture or *transparent plane*, exactly where the natural horizon would appear, and which governs all the level objects in a picture: because, as I told you before, it is determined by the height of the eye.



*Eliza.* It seems difficult to agree with one part of your law, that the appearance of *level land* should be drawn as high as my eye, when, in truth, it is no higher than my feet?

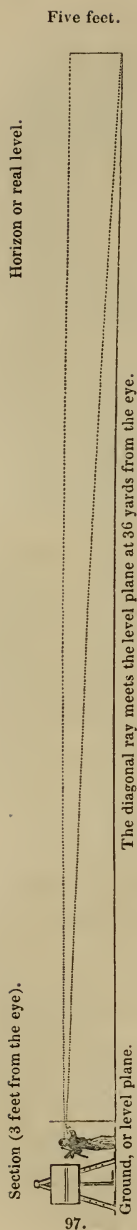
*George.* Your observation is very just; and although you will still find the *horizontal line*, in the picture, as high as the laws of perspective have fixed it, I can give you the satisfaction of knowing, that your inquiry is founded in truth; and yet, strange as it may seem to you, the *rule* is quite consonant with the law of vision. ~

*Ann.* Come, John, we must attend to this curious point; for if the ray of sight does really *descend* from one's eye to the distant horizon, which is admitted to be level, and consequently no higher than our feet, I cannot conceive how George can maintain his rule, of drawing the *horizontal line as high as the eye*.

*George.* The ray, which conducts your sight *down* to the proposed point, is at the same time a conductor of the appearance of it *up* to your eye; and, consequently, in effect, is as high as your eye. Suppose your eye to be five feet higher than the level whereon you may be supposed to stand, and you direct a ray of sight to three miles distance, towards the horizon of a level plain: now conceive a *transparent plane* of glass to be set up for you to sketch the scene upon—(say three feet from you towards the horizon); if you were to draw the horizontal line, on the glass or *transparent plane*, exactly where you would see it—you must allow it would be the true perspective situation of the *horizontal line* on the transparent plane;—and how much would it be below the level of your eye think you?

*Ann.* It must be *somewhat* lower.

*George.* It is, as nearly as possible, only the *eleventh part of the eighth* of an inch lower than your eye, when truly marked on the glass, at *three feet* distance from it: this is an atom in Eliza's favour; but it is too small a difference to influence the rule laid down, that the *horizontal line in a perspective drawing must always be as high as the eye*. And you must observe, that it is the *distance of the transparent plane from your*



eye, which occasions this space between the absolute level of your eye, and the *descending ray*: for were you to advance the transparent plane to the distance of one foot from your eye, the space between the real level, and the apparent horizon, would be reduced the *thirty-third part* of the eighth of an inch; and, agreeably to what I before observed, as the level ray and the descending one both *meet* in the eye, they will therein be of one and the same height.

For the sake of giving you a *diagram* within the compass of our paper, I have reduced the distance from three miles to 36 yards. The diagram (fig. 97) will prove to you, by mathematical demonstration, that an object five feet high, at only 36 yards distance, would be but one-inch  $\frac{5}{8}$  and  $\frac{1}{3}$  in height, when traced on the section, or transparent plane, at three feet from the eye; and, consequently, only *that measure* from head to foot below the horizontal line of the drawing. The two lines drawn on the tablet (which is represented on an easel by the figure) supposes the horizontal line, and the height of a line at 36 yards distance according with the profile, to make the space of one inch  $\frac{5}{8}$  and  $\frac{1}{3}$  of an eighth between them. Then suppose you were to paint a life-size figure or group, with the *perspective distance* at 12 feet, a figure at 36 yards distance must be four times the height of the space found in this example; where the perspective distance of the tablet is three feet.

We may now proceed, till we arrive at the subject (fig. 97), when I hope to make you clearly understand this calculation.

*John.* We are sure *now* that the horizon can never be higher than one's eye.

*Ann.* I thank you, brother. But first let me ask you one more question respecting the horizon.





Suppose you were as high on the mast of a ship as you could possibly be with safety, the sea perfectly calm, and your ship out of sight of land—would the horizontal line, all round, appear to you as high as your eye, in the same manner as it has appeared to me at the Panorama?

*George.* Whether by sea or land, or whether one is on a hill, a mast, or a tower, the horizontal line will be so near the eye's height, as to admit of no deviation from the rule. Come, sit down before the window, and mark the distant horizon on the glass of the sash. Now rise up gradually, keeping your eye on the horizon, and you will perceive it to rise up the glass as you rise, and to have left your first mark of the horizon much below that which you would mark for it now that your eye is higher. *Surely this convinces you?*

*Eliza.* Suppose, brother, we were to throw the window open, then seating ourselves before it, were each of us to make a drawing of the scene before us, would not each drawing have its horizon according to the various heights of our eyes?

*George.* Yes, of course; if you will all take the position proposed, I will make a drawing of you and the scene together: the sun is going down very beautifully—it ought to be a pleasing picture.

*John.* Well, there we are, sure enough: but, brother, you have made the *horizon higher than either of our eyes*.

*George.* You must agree that I could not make *three* horizons in *ONE* picture, according to the rule I have taught you; and you must recollect it was *I* made the drawing, and you know I *stood*, which brought the horizontal line just the height I have drawn it. You will do well to make frequent application to true pictures, and to nature, to confirm all you learn.

*Ann.* I think we comprehend the theory of the *horizontal line*: what is the next matter for our consideration, brother?

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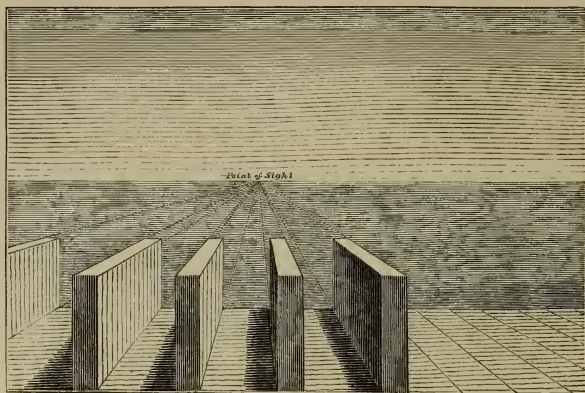
#### THE THEORY CONTINUED.

*George.* Our next business will be to shew John how he may draw an army of soldiers, marching in open column, as at a review.



*John.* I shall be glad to see you do it.

*George.* Now, sisters, look to the drawing (fig. 99), and



99.

remember the rule which it explains, that *all parallel planes, which go directly from you towards the horizon, parallel to the principal visual ray* (or, as other writers on the science express it, *perpendicular to the picture*), whether perpendicular in themselves (as those in the example), or level, or oblique, *converge to the point of sight* (see the roof of fig. 107 for an *oblique* plane, subject to this rule); when in geometrical fact, they are no nearer together at their most distant parts, than they are at the *foreground*.

*Eliza.* What do you mean by *foreground*, brother?

*George.* It is the foremost ground, or that part within the picture which approaches the *base line*; and, in the real scene, is that ground within the boundary of the *aperture*, or picture-frame, which is nearest to the spectator's eye.

*John.* But where are the soldiers?

*George.* I only proposed showing you the perspective situation of the columns or rows.

*Ann.* And you have done it so plainly, that it only requires a little more of John's attention. Now, John, do observe, if these five (apparently) parallel planes were so many ranks of soldiers, could anything appear to keep better order, as soldiers marching?



*John.* (*Ha! Ha!*) I knew it well enough, but I wanted George to draw some soldiers; and I know all those lines on the ground are to represent *parallel boards*, although they all point to that *dot* in the horizon.

*Eliza.* You must not forget what that *dot* is called: if I have understood it rightly, it is that point in the picture which is exactly opposite the eye, and is called the *point of sight*.

*Ann.* Is there any rule, by which we may know on what part of the *horizontal line* this *point of sight* should be placed?

*George.* The best rule I can give is, to place it at, or near, the centre of the horizon of the picture.

*Eliza.* Why, brother?

*George.* I have, from the beginning, endeavoured to fix in your minds, that a picture should be conceived to be the real objects it represents; and the frame, or boundary of the picture, to be a window or an aperture, through which you obtain the view. If this idea has impressed your minds properly, you will necessarily conclude, that *near the centre of such aperture* must be the most advantageous position of the eye; which, you have learnt, determines the point of sight opposite to it in the picture. Now, carry on the supposition—*cover the aperture with a glass*, and observe very attentively the advantage of this central situation of the eye, and *point of sight*, when you begin to trace the scene before you. You agree, I presume, that your eye must be stationary as *to its place*, while tracing the scene; and would view the various objects before you as they fall under different angles from that point.

*Ann.* I do not clearly comprehend what you mean by “*objects falling under different angles* ;” will you please to explain it?

*George.* The rays which diverge from the eye to the objects of study, each form *some* angle with the *principal*, or central ray, at the point or station of the eye. Suppose the extreme width of the picture to be 50 degrees, then the angles, right and left of the centre, would contain 25 degrees each; and every object in the scene would most likely fall under various *smaller* angles (according to the scale of degrees on the protractor, fixing its

centre on the station of the eye, on a ground plan of rays: as in fig. 117), and the more to the right or left objects are from the *principal visual ray, or perpendicular of your eye*, the greater must be the angle under which those objects will fall. I mean that the number of degrees between objects furthest apart, must be the greatest; and in tracing them on the *glass, or transparent plane*, as they would appear thereon, especially near the *foreground*, you would mark them *broad*er than their proportionate size: which will be made clear to you in fig. 114. Let this suffice to lead us on towards a complete knowledge of the *point of sight*.

*John.* I have heard you explain the ray of sight which goes from one's eye, directly through the glass, or transparent plane, to the horizon, as the "*principal visual ray*." This, I think, I understand; but I cannot see how a ray can be *perpendicular* to a picture, without you lay it on the floor, and look down *perpendicularly* over it.

*George.* I cannot expect you to apply all I have taught you at once; but had you recollected the definition of a perpendicular line, given in fig. 13, a, I should think you would not have raised this scruple; but, for the sake of confirming you in a thorough knowledge of the matter, return to fig. 13, which I hope will explain it to your thorough comprehension.

Now you must all attend to the *boy's eye*, and the *dotted line*, or ray, from it to the centre of the canvass, which *dotted line* is drawn to exhibit to your view the *principal visual ray*, as *perpendicular* to the picture; for it is to be understood to be at a right angle with the surface of the canvass on all sides; and if the picture, or canvass, were laid down on the floor, as John proposed, and that ray were a substance of straight wire, properly fixed, it would then be as perpendicular as a plumb-line: therefore, place the surface of the canvass in whatever direction you choose, the wire (thus fixed) would retain its relative perpendicular to it; and any eye directed along this ray (of wire) must, according to the perspective acceptation of the term, be perpendicular to the canvass whereon it is thus fixed.

*Eliza.* Will you shew us how you made the pavement in

this drawing look so square: as the compartments decrease in their apparent width as well as length?—there is some regular rule, I have no doubt.

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## ON THE POINT OF DISTANCE.

*George.* The question which ended our last conversation, brings the *point of distance* now under our attentive consideration; which is *the distance of the eye from the transparent plane* through which you are supposed to see the objects of your study, and on which you would mark or trace them accordingly, were it not for the *geometrical means* you are now learning, to produce precisely the same effect in another way: for although we do not absolutely trace on the glass from a given point of distance for the eye, we are under the necessity of introducing, on a ground plan of the subject (see ground plan, fig. 117), a *section line*, to answer the purposes of the glass, in order to obtain the true perspective measurements of the objects; and the *distance* of the eye from *this line*, or substitute for the surface of the picture, (glass, or transparent plane, all which mean one and the same thing), constitutes the *point of distance*.

*Ann.* I take it very kind that you so often repeat the words “*or transparent plane*,” whenever you have occasion to speak of the surface of the picture; but don’t you remember, brother, we all caught the right idea at the very first, when you called John to the window to trace the view on it? I think you need only say *picture* in future.

*Eliza.* And leave our minds’ eyes to comprehend the rest.

*George.* I thank you, ladies, for your good-nature, attention, and wit.

*John.* Come, brother, shew us what is to be done with this *point of distance*.

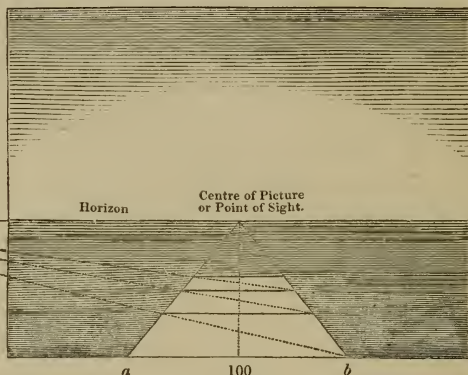
*George.* It is always to be marked on the horizontal line, on the right or left, or both, of the *point of sight*, at exactly whatever measured distance of the eye from the picture may be determined on. Now, Ann, you shall make the drawing (fig. 100).

*Ann.* I have some *parallelograms* ready drawn.

*George.* First draw the horizontal line, any height you choose, and above twice the length of the picture; taking care that it be parallel to the base line. Now find the *centre* of the picture, and mark it on the horizontal line, as the *point of sight* (fig. 100); then take the length of the picture (with the dividers) for the *distance* of the eye from it, and set one foot of the dividers on the point of sight, and the other will mark

Point of Distance.

the *point of distance* towards your left hand on the horizontal line (as in



the example); next draw a perpendicular line from the *point of sight* to the base line;—now open your dividers any width you choose; for *half* the width of a square of pavement, set one leg on the centre of the base line, and mark the points *a* and *b* on each side of it with the other; then draw lines from the points *a* and *b* to the point of sight. This determines the perspective width of the pavement. Now draw a line obliquely, from the *point of distance* down to the opposite side of the pavement, terminating at *b*, on the base line; observe, where it crosses the left hand retiring line of the pavement—that is the *point* which determines the depth of the first square, which is *equal* in perspective effect to the *absolute width on the base line*: this must be well understood and remembered, as *one of your rudimental principles*, in all similar instances: thus, you have only to draw a horizontal line from it to the opposite retiring line of the pavement.

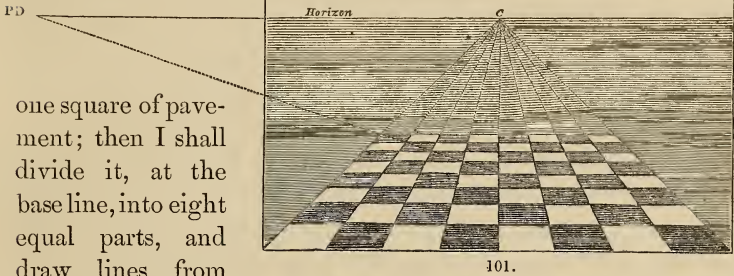
*Eliza.* Oh, this is delightful! let me draw one square.

*George.* Only draw an oblique line from the *point of distance* to the same side Ann did, and down to the top of her square,

and rule the horizontal line. Now we have two squares: come, John, you do the third.

*John.* That is soon done; but I wish to see as many as are on the chess-board—then we should know how to draw a whole floor.

*George.* You shall; and *I* will draw it, to teach you to handle the instruments in a better manner than you do. Now attend: I shall first draw the representation of the whole chess-board (fig. 101), as one large square seen in perspective, by the same process that Ann found the perspective of



one square of pavement; then I shall divide it, at the base line, into eight equal parts, and draw lines from them to the centre, or point of sight: these divisions will cross the oblique line (which I first drew, to find the whole square) exactly where the horizontal divisions of the squares must be drawn, giving their *apparent* depth equal to their geometrical width.

*John.* I see this *comes*\* like all perspective: but I wish you could draw them to appear *quite square*, as the real object does when I am not thinking about perspective: this drawing *appears to diminish*; and the furthest divisions look *really smaller* than the nearest.

*George.* I hope I shall be able soon to clear away this very reasonable objection. One reason, perhaps, why the drawing does not give a truer effect may be, that this sort of lesson is drawn with too little attention to the gradual diminution of *each*

\* Professional term for *effect produced*.



retiring line, as it recedes from the base line; but the chief reason is, that the utmost perfection perspective can give to a picture, is only to convey the true idea of a scene, or object, when viewed at the *very point* of distance the artist determined his picture by; which, you have already been informed, means the measured distance of the eye from the picture (see page 44, fig. 96).

Suppose then the picture to be one, two, or more feet in length, that measure will determine a proper distance to view the picture, if the distance be taken by the rule I have made general in my diagrams. The examples I have given you are *small*, and the *point of distance* proportionate to them: but if you can bring your eye to that distance, you will find the effect you wish. Now, for experiment's sake, open the dividers to the length of the distance (fig. 101) that is equal to the space between the point of sight and the point of distance; keep one foot on the point of sight, and raise the other, as nearly as you can, perpendicular over the point of sight; then bring your eye carefully to the *raised* point of the dividers, so as not to hurt your eye, and look stedfastly on the drawing for a few seconds, and you will find the true effect is properly produced.

*John.* Indeed, sisters, you must try this experiment; for the whole drawing of the chess-board looks really square, just as I meant: mind to keep your eye perpendicular to the point of sight.

*Ann.* I confess I felt the same objection John made, till we had this experimental proof; but it is now so clear, that I think I could give another example.

*Eliza.* Pray, Ann, treat us with one of your best.

*George.* I see Ann is prepared.

*Ann.* It is certain, when I look upon any object, that my eye is at the *only* point at which it could possibly see it in that particular shape; and were I to draw it, while viewed from that point and distance, ever so perfect in all respects, I think that no one (who was not determined to be deceived) could suppose the drawing to be the real object, except while viewing it exactly in a similar light, shade, and distance, as the object



was when drawn. Now, only lay the dictionary on the table, as we sit in two different directions from it,—were we to make each a drawing of it, and then exchange drawings, without, at the same time, changing places, it would be impossible to compare them with the original; and, equally so, to suppose either could be taken for the real book.

*Eliza.* I am very much obliged to you, sister. Now I wish to ask George, why the *length* of a picture is fixed on as the proper distance of the eye from it?

*George.* It is the SHORTEST distance allowable; because, were you to take a *nearer point*, you could not conveniently perceive, at one view, all the objects within the boundary line of the transparent plane, right and left, above and below the point of sight or centre of the picture; for the same distortion and widening of the appearances of objects, that fall under a greater angle than about 25 degrees from the principal visual ray, would occur, which I shall describe to you hereafter by fig. 114; the triangle, therefore, which would shew you the largest view a painter should take, is found in the heptagon, as a ground plan, by taking the centre for the station of the eye, and any one of the circumferent sides of the heptagon as the length of the picture or section line; which conclusion determines a single landscape to be about one-seventh part of the whole panorama, or circle.

*Ann.* I perceive the great importance of taking a proper distance; and if I comprehend what has passed, I think the *point*, in all respects, which we take to *paint* a picture must be the best point *to view* it from, as I have tried to prove by drawing and viewing our dictionaries.

*George.* You are perfectly right, sister; and I expect this subject will afford you some entertainment when we study the term "*foreshortening*."

*Eliza.* I suppose, then, it is contrary to the laws of perspective for one to go to various stations in a room to view a picture, since *that point* and *distance* which the painter performed his work by, is determined to be the best?

*George.* Most assuredly it is, when the light falls properly on the picture; but, unfortunately, many very fine paintings

are hung so disadvantageously, that the glittering of the varnish or glass, is all one can see at the true mechanical point; this obliges one to take some indirect position to avoid the glare. Without some such good reason, you may rely on the "*rule in perspective*" as an unerring guide; always taking a position perpendicular to the point of sight, and moving forward or backward till you find you are at the *painter's distance*. For the direct perspective picture of any *long room* will appear longer or shorter than the true measure, by taking a greater or less distance to view it from than that which the artist appointed for the scientific government of his work;—and to do this is a duty you owe the artist before you are qualified to criticise the *perspective* of his picture,—especially of *circular planes*.

*John.* Will you tell me why pictures of circular planes require to be viewed from the proper point more than the representation of any other object? and at the same time tell me what are circular *planes*?

*George.* Circular planes are circles described on flat surfaces, as a circular waiter, a coach-ring, a wheel, the top of a saucer, cup, or glass; the horizontal section of a column, etc., etc.; which will not only appear very unpleasing, but incorrect, when seen perspectively in a picture from any point except the true point of sight and distance. Perhaps the *direct front view* of St. Peter's at Rome (of which there are engravings with the circular colonnades,) is one of the best specimens you can prove this by; for, on viewing this picture obliquely, and at a *wrong* distance, the whole scene is distorted.

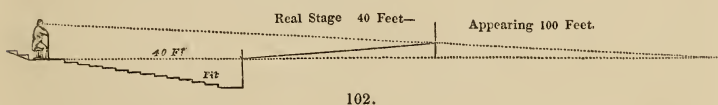
*Ann.* I thank you, brother; this explanation leads to the solution of an effect which has puzzled me ever since we were last at the theatre. You know we sat *on one side*, near the stage, and the scenery and side wings appeared so badly arranged to what they were before, when we sat in *that box which is behind the pit*; then they all united so surprisingly naturally, that I wondered at the ingenuity of the contrivance: this was owing to my being much nearer to the *painter's point* at one time than at the other; was it not?

*George.* Your observation has been very correct; and it is

extremely cheering to me to find myself so well understood; for when you sat in the *front box*, you were *on an exact level with the horizontal line* of the scenes, and at *the very point of distance* the artist drew them by, or *should* have drawn them by, which governs the perspective associations of the stage, scenes, and side wings.

*Eliza.* I did not remark what Ann did; but I could not discover that the stage was not level till we sat *last* in the *side box*. Why does it slope downwards towards the front?

*George.* The *stage* should be made to have a *due inclination* towards the *horizontal line*, as the *side wings* have to the *point of sight*, governed by the distance of an eye in the centre of the front box; where the deception or stage effect is the greatest, and the converging inclination the least perceivable. Suppose a theatre to be eighty feet long from the front of the boxes to the utmost extent of the stage, then allow forty feet for the pit, and there will remain forty for the stage; but should it be required to make the stage appear 100 feet long (fig. 102 a profile),



102.

draw a level line 140 feet long (by a scale suited to the extent of your paper); then make a mark at forty feet for the length of the pit, and a perpendicular mark at forty feet from the front of the stage, which is the *real* length of it; then suppose an *eye* in the front box about four feet above the level line first made, and draw a ray from the *eye* down to the end of the 140 feet line; and where it crosses the perpendicular, which you marked to represent the real extent of the house, is the point to which the back of the stage must be raised, and it will correspond with the proper horizontal line, and produce the effect.

*John.* Upon my word, he must have been a clever fellow who *first contrived* all these things.

## HOW TO BEGIN A SKETCH FROM NATURE.

*Ann.* I WANT to know if I could sketch a *large extent* of prospect on a leaf of my little sketch-book?

*George.* You may sketch an extensive view on paper of *any* size, by due regard to proportion. Recollect the *small* prints you have seen from the life-size cartoons of Raphael; and Claude Lorraine's original sketches\* from nature were very small when compared to the inimitable pictures that he painted by them.

Perhaps there cannot be a more certain method of finding how much your paper will probably contain, at one view, than by holding up the edge of it horizontally, at about the length of the leaf distant from your eye: now observe, if this leaf were a *glass* you might sketch the whole scene on it, according to our original rule, but as it is not transparent, you must carefully mark the top with your pencil, in contact with each of the *principal* objects; observing, after you have marked the situation of the first *most* conspicuous, to keep that mark directly in contact with its object, when you mark the others: and when you begin your drawing, look to the touch at the top of your paper for the situation of the object perpendicularly under it. But first, you must use this same method for the *heights* of objects, by finding an object on the ground for the height of your base line; then bring the bottom edge of your paper to that mark, and mark *heights* on the *side* edges of it, taking great care to abide by that point in the landscape which you determine to be the bottom line of the drawing, and the same distance you first held the paper at.

*Eliza.* This I understand; but how should I proceed were I desirous of taking into my picture a *certain object* on the *right hand*, and some other picturesque matter on the left; and on holding up my paper at the proper distance, should find it too short to include all I would draw?

*George.* If it be practicable, and a picturesque effect can be preserved, you may obtain your wish by *taking a greater distance*

\* A large collection of which are the property of His Grace the Duke of Devonshire, and are engraven as facsimiles, in the "*Liber Veritatis*."

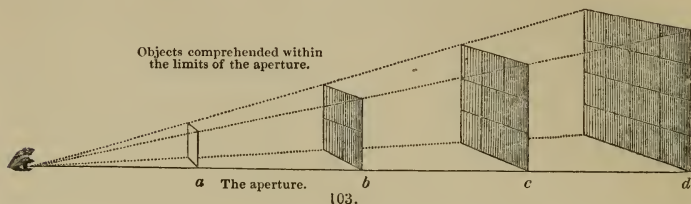
to view the scene; especially if those two extreme objects you wish most particularly to include, are no great distance from each other. Let us return to fig. 88, page 34, and suppose the whole line *ca* to be the *principal* ray of sight: and that part of *db* which lies between *b* and the right angle, to be *half* the length of your tablet—then, suppose your first station to be at *a*, you could sketch nothing to the left of *b* (we take the diagram as a ground plan), but should *d* be a desirable object, you can include it in the original space by moving back to *c*; but I must not confine you too closely to rule in this particular. *The rule is the standard*, and should never be lost sight of: yet there are beauties in picturesque nature which perhaps would be lost to the portfolios of the landscape painter, if he confined his labours too strictly to rule: genius must ever be one of the council, and *necessity* has no law.

*Ann.* Now, suppose I had made all those leading marks on my paper; how am I to obtain the *oblique lines* which so generally occur in the perspective appearance of buildings?

*George.* Take care to keep the top edge of your paper strictly horizontal, and move it higher or lower, till you see the lowest end of the *inclined line* you would obtain in your drawing; then sketch a line, as near the top of your paper as you can, parallel to that line of the building which is the subject of your observation: this must, of course, be done carefully over the place in which it is to occur in the drawing; and its length is supposed to have been previously marked on the top edge of your drawing, according to the former part of this instruction. A very few of such lines as are the representatives of converging *levels* (such as top and bottom extremities of roofs, the horizontal lines of rows of windows, and the base, or ground line of level objects), if truly marked in their proper places in the drawing, will converge to the horizon, and indeed, by their meeting, will find and fix the station of the horizontal line of the drawing; which, once obtained, will govern the *inclination* of all other levels. It may be a very good experiment to practise this from large pictures, within doors, first; for you have all the points the same, if such pictures are *truly* drawn from



nature. If the picture you would make this experiment from be four or five feet long, you must be that distance from such picture, and your paper must be held *its length* distant from your eye, as if you were viewing a scene in nature. Fig. 103



will shew you the necessity of holding or setting up your tablet at one invariable distance, as we find the transparent plane of the tripod, in order to make your leading marks available towards the general truth of your first sketch. Consider the aperture *a* to be your sketch-book, held up to draw any object that might be on *b*, *c*, or *d*, and it would cover either, exactly, or in effect as the eye at the beginning of the line *would see* them; therefore any alteration of the distance of your tablet from your eye would vary all the proportions previously marked. I have placed the surfaces in this diagram about *three* feet apart (instead of *one* foot, which, according to our rule for perspective views, as above given, is the proper distance, because the aperture is one foot), this is done that each surface might be seen by the student clear of the other in this example. The eye, not *your* eye, is there represented as looking through *a*, the square aperture; and the surface, *b*, shews you that the eye can see a space twice the length and breadth of the aperture, at twice its distance; and three times each way, at three times the distance; and four times four, at the fourth distance; and so on, in the same progressive proportion.

*John.* Then I think I can tell how large a space might be seen through the one foot aperture, at nine times the given distance from the eye.

*Ann and Eliza.* How can you tell?

*John.* Nine times nine is *eighty-one*; is it not? then that would be a surface of eighty-one square feet.



*George.* You see, sisters, that boys do not learn their multiplication table for nothing; you have known it as perfectly as he does, but practice has strengthened his memory in this particular, and enabled him to apply his knowledge readily: it only required your recollection of the explanation of the *square of a number*, to have had no doubt of John's making the answer he has.

By this diagram, it is proved that, at the distance of a mile, a space of one mile, from right to left, would be comprehended by the eye, within this *one foot aperture*! when held up at *one foot* distance from it. Do not fancy any thing more *deep* or *intricate* than it really is. By sufficient APPLICATION you will find all become clear.

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## AN ANGULAR VIEW.

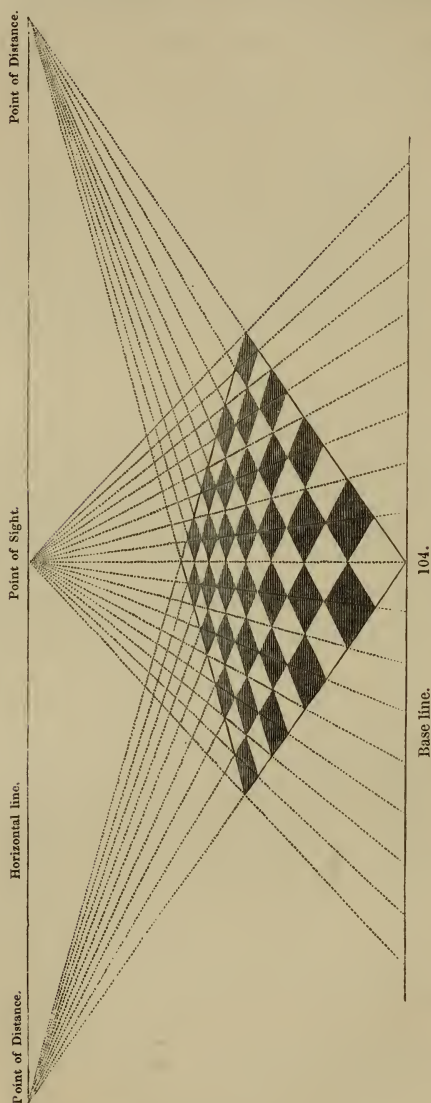
*Ann.* I NOW want to know how to draw the chess-board, in perspective, when viewed with one corner or angle of it nearest my eye, instead of the side?

*George.* I have one drawn (fig. 104).—Now I beg you will begin attentively, and endeavour to explain the manner of drawing it.

*Ann.* I should first draw the *base line*, then the *horizontal line*, and mark the *point of sight* about the centre of the horizon; and draw a perpendicular line from it to the base, to mark the corner of the board nearest me; then I should mark the *point of distance* on the *horizon*, equally on each side the *point of sight*; then I see you divide the base line into sixteen equal parts, eight on each side the centre, and draw lines from each to the point of sight; then draw the two oblique lines, from the *points of distance* to the *centre on the base line*; this, I perceive, forms the two nearest sides, and the hithermost angle of the chess-board; then I have only to draw lines from all the points, where the sixteen equal divisions cross the two oblique sides, to the opposite points of distance, and the outline is done.

*George.* Those points, which you called the *points of distance*,

are also *vanishing points* (as will be explained on fig. 117, page 89); and the distance of the eye from the picture will not determine



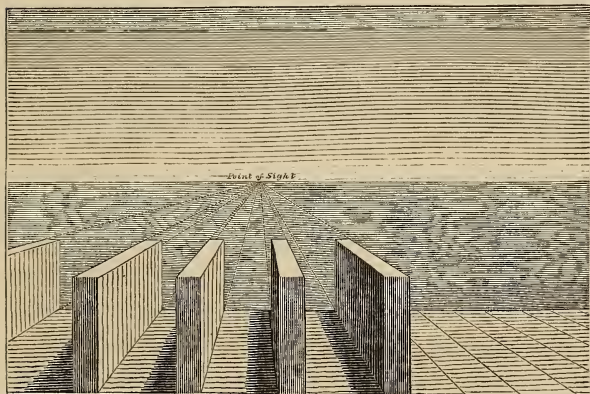
their situation, except in a very *direct* diagonal; in all others, one point will be further from the *point of sight*, and the other nearer, according to the angle you view it under. But the distance may be always ascertained by dividing equally the space between the two *vanishing points* of a right angled object in a truly drawn picture. When you begin a ground plan, preparatory to a perspective view, observe to ensure the size of your paper to the problem, by first making a section line, then open the compasses from it to the base line of the paper, strike a half circle downwards from the section line, and where it is cut by the half circle, the two *vanishing points* are given to the full extent as in fig. 117.

The student must never neglect to turn to the illustration referred to.

### ON FORESHORTENING, AND ANAMORPHOSIS.

*Eliza.* Now, George, will you give us a clear idea of the *technical term, foreshorten, or foreshortening?*

*George.* The word PERSPECTIVE is a general explanation of the term; because the effect of all surfaces, except those whose sides are directly opposite to the eye, and at an equal distance from it, are produced in the picture by *foreshortening*. Observe the *five parallel planes* in fig. 105; those two which



105.

are nearest the centre of the picture are the most *foreshortened*—the edge of one of them is nearly opposite to the eye; yet *foreshortened*,

as it is, I believe you have never doubted its being a tolerably just representation of a surface equal in size with the other four. The regular diminution of the chess-board (fig. 101), as it recedes from the eye, is *foreshortening*; but the term is most particularly applied to such figures as are more distinguishable by their *length* than their *breadth* or *thickness*; as the limbs of the human figure represented *endways*, or pointing out of or into the picture, towards or from the eye of the spectator. Foreshortening the limbs of the human figure should be as much avoided as possible, especially in single figures, for they seldom produce an agreeable effect, even when drawn with the utmost skill; because the most

successful treatment of a *foreshortened limb* will only convey the effect agreeably and truly at one particular point of view, which you *now* so well understand, namely, the exact distance the painter viewed it from; for in taking a greater distance than the painter, it will look too long, and on a nearer view, too short: yet there is a picture which, from the skilful management in the foreshortening of a figure in it, has obtained the title of "*Miraculous!*" and there is a picture by one of the Dutch masters, of a man presenting a gun directly to one's eye, which excites the idea of "*Beware!*" yet you see only the muzzle of the gun. There is also a very pretty Cupid, by Cosway, drawing an arrow to the head, pointing directly towards one, entitled "*Beware!*" The arrow and the barrel of the gun are, in the painter's phrase, *foreshortened*: genius and judgment must govern this very difficult point, because it will sometimes be not only unavoidable but absolutely necessary to that *variety* of character and expression, which should naturally appear in groups, as well of animals as in the human figure.

*Ann.* Then if I lay a print, or drawing, *flat* on the table, to copy it, I must view it *foreshortened*, which would be an imperfect representation?

*George.* You are right, sister; this thoughtless or ignorant habit, with many who attempt to copy a print, or drawing, thus laid before them, arises from copying by writing, where it matters little how they place the original, so that they can but read it: in the same manner they think they can copy a picture, if they can but obtain a glance, so as to *conceive* they see the object before them. I say "*conceive*," because, unless it is placed, as *all pictures should be*, according to the rules already explained, students must depend on a thorough knowledge of design, and copy rather what they *know* to be in the picture, than what they could possibly see while viewed in an *indirect position*.

Now, John, tell me how long the 12-inch rule appears to your eye, as you see it *endways* to you, where you sit? (fig. 106.)\*

\* Notwithstanding the clearness both of the drawing and dialogue, the student should make the experiment practically—*lay a rule on a table*; and study the subject thoroughly.





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*John.* I think it appears *twelve inches* long.

*George.* And I will presently prove, that it only appears about *three inches* long to you. Come, sit still, and shut one eye; now mark with the pen (carefully) the shape of the rule on this glass which I hold up;— there you see it is, as I told you, about three inches long.

*John.* That is very surprising! why, I drew the whole length of the rule, and you know it *is* twelve inches. Must it be so short as I have traced it on the glass, were I to sit down here to paint a picture of it without tracing?

*George.* Most assuredly; because PERSPECTIVE requires you to draw things as they *appear*; and this tracing of the rule on the *transparent plane of glass*, is a general outline of its *appearance* at the point you viewed it.

*Eliza.* It is clear to me now, having this perspective drawing of the *12-inch rule* on the glass, that there can be no position proper for me to set it in for copying, but that wherein the *principal visual ray* of my eye would be a perpendicular line to the point of sight of this surface, as *John's* was when he traced it.

*John.* Why, sister?

*Eliza.* Because your perspective representation of the rule has already reduced twelve inches to three; and, were you to lay it on the table, where the rule is, and copy truly what would then really appear to your eye, I suppose the second drawing would only be about *three-quarters* of an inch long!

*Ann.* This would be *foreshortening foreshortened!*—I am now so convinced of the absurdity of looking *obliquely* on a picture when copying it, or on my own drawing, that I fear I should shew symptoms of *ridicule*, were I to see any one copying a drawing set *obliquely* before them, and it is but fair to begin with myself. I must laugh when I recollect how improperly I have placed some of the things I have attempted to copy.

*John.* But, sisters, how is it then that I have taken copies, which you all have praised, from drawings laid *flat* on the table?

*George.* Do not you recollect that you often took up the original, to have a *direct view* of it, as you proceeded?

*John.* O yes! I believe I did.

*George.* *It was thus* that you learnt what you had to do; for had you never seen the original in any but the oblique view you had of it when laid flat on the table, you would never have earned the praise you received.

*John.* Thank you, brother; I now see the necessity of taking the same point to copy a picture, as one ought to take to criticise it.

*Eliza.* 'Twill be good fun to see persons twisting and turning pictures about in all directions, saying, "Now I have it completely," when the picture is in *such a position* as to represent only an *anamorphosis*.

*Ann.* And to see the *connoisseurs* pulling one another to various positions, saying, "Do but come here, I have it to perfection!" Ha! ha! ha!

*George.* This is the mirth I promised you; it is the well-earned joy of intellect refined by rudimental information; yet we must not suffer vanity to grow up with our knowledge, but patiently teach those who desire to learn, and suffer the lazy and "*will-governed*" ignorant to pass on in their errors.

*John.* Pray, brother, will you explain the meaning of the word that Eliza made use of just now?



*George.* “*Anamorphosis*” was the word, I believe—it is a sort of drawing, which, to the direct view, represents a monstrous deformity, entirely unintelligible; but when seen in one certain direction, or viewed in a cylindrical mirror, appears regular and in due proportion: and I think Eliza made a very proper use of the word.

*John.* Can I see an anamorphosis any where?

*George.* Yes, in the Encyclopedia, and at *some* of the optician’s shops.—What are you smiling at, Ann?

*Ann.* An expression of yours.—When you were very young, you saw some incorrect pictures, and father has told me you gave him a smile of gratitude for the early information he had given you, and said to him, “*What a fine thing knowledge is!*” I am now in a similar mood, enjoying the knowledge which he has enabled you to give to us.

*George.* May I conclude, then, that you are perfect in the progress we have made?

*Ann.* I think, with the assistance of my *drawings* and *notes*, I could perform and understand all that you have taught us. But I expected you to say more in explanation of *vanishing* points, when Eliza introduced the subject of *foreshortening*, which, being equally interesting to me, prevented my interruption till you had completely explained it; and I now shall be glad of your farther assistance, to enable me to take a clear view of the *vanishing* points.

#### ON THE VANISHING POINTS.

*George.* They are those points in a picture towards which all *lines* and *planes* which are parallel to one another, converge; the *points of sight* in figs. 95, 96, 99, 100, 101 and 103 are the vanishing points of the level and parallel objects in them; the term *vanishing point* belongs equally to such converging points of parallel and level planes, as (from their oblique position to the eye) fall on some remote part of the horizontal line.

*Eliza.* Do all vanishing points fall on the *horizontal line*?

*George.* Only those of *level* parallels, such as the chess-board, the pavement, and the shelves; but the converging point of the visible *unlevel* parallels, which are called inclined planes (see the roof of fig. 107, as explained below), must fall above the horizon, according to their obliquity: these vanishing points are called *accidental points*.

*Ann.* Will you shew us an example or two, to make us understand these distinctions?

*George.* Figs. 107—110 will shew you such objects as have some of their sides in such directions, as to have their parallels converging to vanishing points, not on the horizontal line. The roof of fig. 107 is formed of two *inclined planes*, and the *vanishing point* of the sides *a* and *b* must ascend far above the horizontal line, and would unite perpendicularly over the *point* of *sight*, which is the vanishing point of the *level planes* in this perspective view; and were there fifty (more or less) *such* houses adjoining the example, and seen in the same direction on the receding line, the visible sides of their roofs (if all of the same obliquity) would converge to the same V. P. as the two lines *a* and *b*; because *all retiring planes, that are parallel to one another, converge to one and the same V. P.*, further explanation of which will be given in the figures on Shadows: but I shall (in this stage of our study) produce the inclination of the sides *a* and *b*, without finding the vanishing point.

*Ann.* Is the method you *now* propose, better than the one you allude to?

*George.* I find it as scientific, and much easier to beginners; and, producing the same effect, I consider it, for the present, preferable; for many of the methods already extant, appear to be more difficult, being scientific confirmations of truth, rather than the readiest means of attaining it: yet you should learn them all.

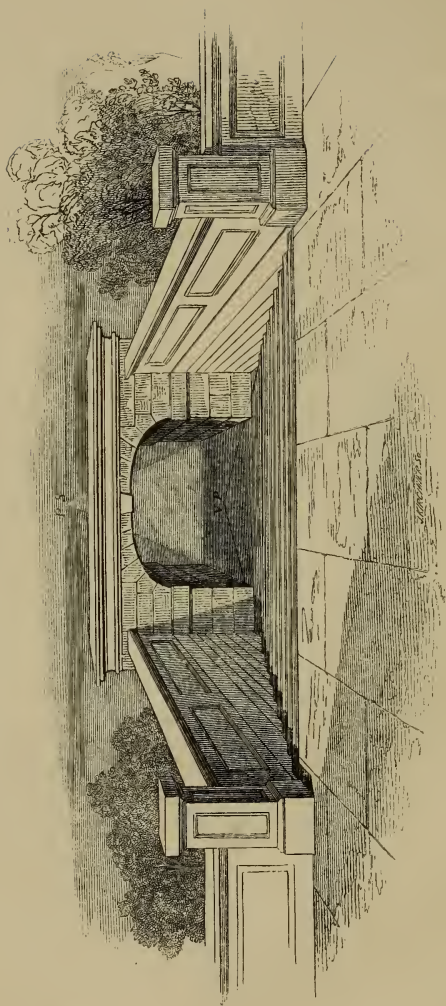
*Eliza.* Come, then, shew us how to draw the roof of fig. 107.

*George.* Now attend, and apply to the figure at every reference, while I teach you how to draw it: as it is chiefly to illustrate the method of finding the *points of the roof*, I have not made any scale of dimensions. First (after having drawn the parallelogram as a boundary line to your picture) draw the horizontal line,

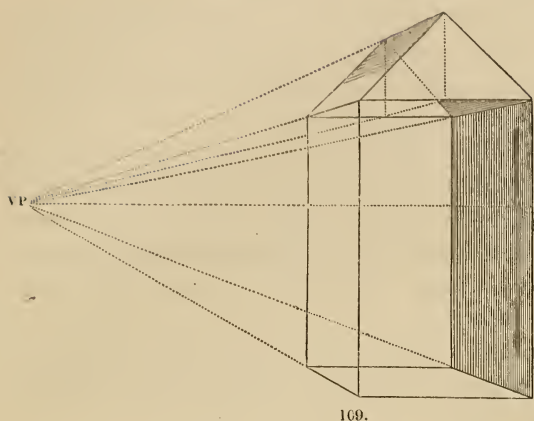












to the method used in fig. 107, and page 69, line 27, and raise a perpendicular the height you require, and draw lines to the top from the three apparent angles, and the sides of the

spire are *inclined* planes.

*John.* I think you should have shewn us these things before you taught us to draw cottages and roofed buildings, for I begin to think all I have drawn must be very much out of perspective.

*George.* That lies at the door of your examples hitherto; as your practice has been rather to bring you to the right method of using a pencil, and to learn to distinguish a perpendicular from a level, and a circle from an oval, or a right angle from an acute or obtuse one, by the means of sight and practice; in order to obtain a correct *eye* and *hand* from the study of others; but now, as you are improving, it is proper you should know the cause of the effect you produce, and form a critical judgment of whatever you take in hand.

*Eliza.* What are we to learn from fig. 110?

*George.* As these figures are on the subject of inclined planes, and the converging or vanishing points of their parallel sides, I have thought it proper to give you one example of an inclination of the plane, receding downwards, directly before you, as a “down-hill” effect, towards the arched entrances. The vanishing point in the declining planes of this figure, as in the roof of fig. 107, is produced by the meeting of the lines of its two sides; and consequently arises out of the process in drawing the figure, which saves the trouble of searching for this point, as a necessary means of *performing* the work.

*Eliza.* And will it be quite sufficient to enable us to draw any inclined figure?

*George.* By proper application of all the simple maxims that I hope to make you acquainted with, you may possess *competency*; but the *riches* of geometry and mathematics, like gold, require incessant searching after.

I would not, on any consideration, hint at a wish to prevent your acquiring full information of all that has been produced on the subject by the most learned authors, had you the means: but a more extended knowledge of mathematics than you may ever find time, or perhaps inclination to possess, is absolutely requisite to the pursuit.

But let us proceed to talk a little about the perspective of circles, as you will frequently require to know how to draw circular objects correctly.

#### THE PERSPECTIVE OF A CIRCLE.

*George.* A CIRCLE seen in perspective, is a regular *ellipsis*; therefore you have only to find the perspective view of a square, in which the circle is described, as any one of the squares of the chess-board (fig. 101), and describe an ellipsis therein. This, expert draftsmen can do sufficiently correct *by hand*, for general purposes—but for architectural drawings and circular machinery, it will be proper to use a certain method; one, attributed to *Serlio*, I have given (in fig. 111 G), with an additional example of a circle on the same range, but not directly under the point of sight (see fig. 111, G and H).

*Eliza.* Pray, brother, how are we to proceed?

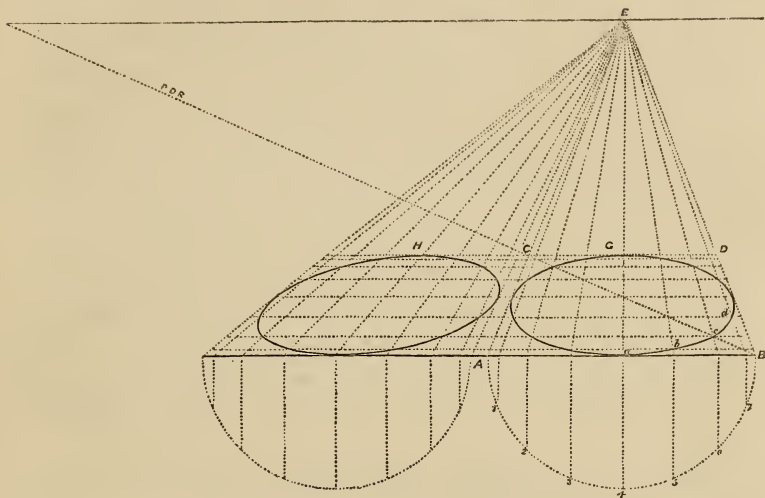
*George.* I hope the example is sufficiently clear to direct you in that. Take courage and begin, and I cannot doubt but you will accomplish it.

*Eliza.* I shall begin with that which is marked G, as I find its *apparent* square part is explained and produced exactly as the chess-board (fig. 101).

*George.* Then leave a small space between G and H, and set off the same width for H as the figure G, which you have drawn; and carry the ray to the same point of sight, E; the depth inward or upwards is determined by that of G: this completes two squares in perspective, within which you are to

describe the perspective lines of the two circles, by the process laid down in your example.

*Eliza.* I perceive I must draw a half circle under each square, and divide these into eight equal parts: and then draw perpendicular lines from each division till they touch the line *A B*, and from the point *E*. I find the same divisions are repeated *across* those I have drawn to the point of sight; in which I am governed by the diagonal ray *P D R* which I first drew from



111.

the point of distance to find the depth of the whole square, precisely as the horizontal lines of the chess-board were drawn. Now I have only the circles to draw, which I see pass through those angles which you have marked *a b c d*, &c.; this will easily direct me to the end of the operation; as I understand I have only to repeat the same on the other square, which is marked *H*.

*George.* I hope your success in this will encourage you;—for if you attend to the directions which must of course accompany such drawings, the vast number of lines, which at a general view appear confusing, will lose that effect as you proceed; and the principles will be unfolded to your mind more forcibly than when you have a master by your side to help you over every difficulty.

*John.* But this only teaches us to draw the perspective of circles on a floor or a table: how are we to describe the circular

arches of doors and windows, or draw the perspective of a circular ceiling?

*George.* The example will answer either of your questions; thus :—Continue to consider E as the point of sight, and make E a 4, the horizontal line, turning the diagram accordingly, and place the perspective of the circles to the right or left of E, and you will find the arches you require. And, for a ceiling, turn the diagram upside down.

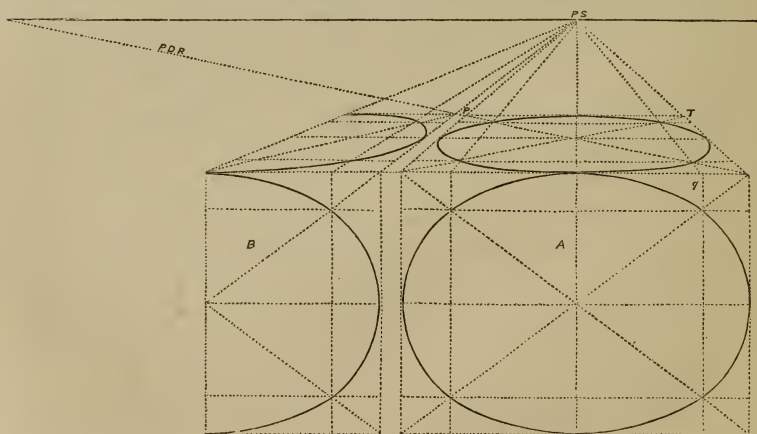
*Ann.* Are circles in perspective *perfectly* elliptical?

*George.* Yes; although it has been questioned by some. But you may prove it by the simple experiment of drawing a circle in perspective, in any aspect; and upon doubling it outwards correctly in half, and holding it up to the light, you will see the two *semi-ellipses* to tally, so as to appear but one; or you may, after folding it, mark a number of pin holes through one side on the elliptical line, and you will find that they have passed through the other half. For *this* experiment, you must find its two *extreme* diameters, that it may be properly folded; as no view of a circle in perspective, except a *direct one* (as in the example G, fig. 111), will give the long diameter level.

*Ann.* I believe our problem XXII. in geometry, will teach us this.

*Eliza.* Yes. But now I don't think I could draw an OVAL in perspective.

*George.* I will give you a very plain method. Draw an



oval (*A*. fig. 112) by Problem XVIII. or XIX., and then draw the parallelogram to it, as in the example; then draw the two diagonal lines from and to their opposite angles, through the centre; then describe the half oval *B*, and add the half parallelogram as on the first, and the diagonals of it, from the two angles to the centre. Now draw the level and the perpendicular lines, so as to cross the oval at right angles: on the points where the diagonal lines cut it. Now draw the horizontal line which is above the diagrams (higher than in the example, to enable you better to distinguish the lines which describe the perspective oval, as you see in the diagram over them), and, fixing the point of sight perpendicularly over the centre of *A*, draw all the lines to it (as in the examples); mark the point *q* on the right of the centre of the oval, lay your ruler on *q* and *P D*, and draw the *P D* ray, down only to *P*; draw the line *P T* parallel with the horizon on both figures, then the two diagonals as correspondent with those in the oval, and where the diagonals cross the converging rays draw the horizontal lines; thus you are provided with points through which (as you see by the example) the perspective oval must be traced, and is found.

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## PRACTICAL PERSPECTIVE.

*George.* Now, Eliza, we can proceed to what you termed “*prophetic*,” in Perspective, by drawing various objects to measurement, as they would appear if seen from a given point. Our first essay shall be the perspective view of a level walk, which may represent the appearance of twenty yards long, and four yards wide, on the sides of which I will place six square posts, each one yard high, and nine inches square, at equal distances from each other (fig. 113). Need I now repeat the method of proceeding?

*Ann.* No, brother: I will undertake to prove to you that I understand the process, if you will kindly point out any mistake I may make.

*George.* I shall be very happy to see you do it: but let me



just remind you of our general rule, to draw considerably larger than the example—and let me also impress upon you that (by due application to your *scale*) the rule you will receive for drawing this problem, will serve to guide you in taking a perspective view of all such geometrical objects as are perpendicular, level, and parallel; as streets, squares, walks, roads, rooms, &c., by applying their geometrical dimensions properly. For, suppose all the *posts* were immense obelisks or towers, and their distances asunder bearing the same proportion to their height as they do in the example, the drawing might be precisely what it is; they would however in such case most probably rise far above the horizontal line. And when we come to fig. 117, and you have made yourselves thoroughly acquainted with it (which will require *practical* study), it will only be necessary for you to draw a few different subjects, such as come properly under the laws of our present problem, and the whole of fig. 117, and you will find yourselves able to draw geometrical objects in any similar direction.

*Ann.* I will draw it on this half sheet of foolscap. I shall first draw the size of the picture, not more than two-thirds the length of the paper, that I may have room to mark the *point of distance* at the proper place on the horizontal line; then divide the height of my drawing into three, and give the one-third from the base line for the height of the horizontal line, which I shall thus draw. This space I see you have divided into five equal parts: I understand each division is to be considered as one foot, which forms a scale for the measurement of the rest of the work.

*Eliza.* Why do you determine the horizontal line to be five feet high, brother?

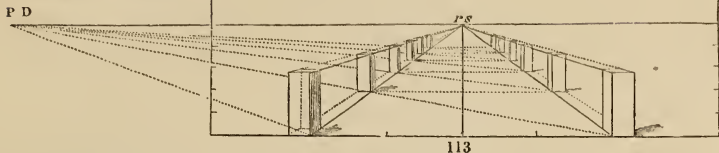
*George.* Because this prospect is considered as a *level* one, viewed by a person *standing*; whose eye would be nearly that height: and five feet being a whole number, is better adapted as a rule, than five feet, six inches, which might be rather nearer the height of the eye of a tall man.

*Ann.* I now draw the *horizontal line the whole length of my paper*, and mark the point of sight on the centre of the picture; then, with the dividers opened to the *length of the picture*, placing one foot on the point of sight, and touching the horizontal line with the other, I find and mark the *point of distance*, as P D.



*John.* Why do you draw the horizontal line so much longer than the picture?

*Ann.* That I



may mark the point of distance on it: have you forgotten how we found the first squares of the pavement? (See fig. 100.)

*George.* Very good, indeed!—Proceed.

*Ann.* I believe I must next draw a perpendicular line from the point of sight to the base line, and then mark *six feet* according to my scale on each side of the centre on the base line, for the width of the walk.

*Eliza.* Pray, sister, how will you determine this measure?

*Ann.* From the height of the horizon; which is determined to be five feet. I take six of those divisions; is that correct, George?

*George.* Certainly.

*Eliza.* I feel I must have been forgetful of what you explained respecting the *little scale rule*, in the case of instruments; but I am very glad I have inquired, as it helps to confirm the knowledge of drawing *proportionately* to a real object.—Excuse the interruption.

*Ann.* I shall now decide the width of the rest of the walk, by drawing lines from the point of sight to the width marked out on the base line; then, as there are to be six posts, there will of course be five intermediate spaces of four yards each (except the nine inches for the size of the post), which are found exactly as we did the squares of the pavement (fig. 100); and by repeating this five times from the base, towards the horizon, I shall produce the perspective length of twenty yards, with the addition only of nine inches beyond the farthest post.

*John.* And how will you draw the posts, sister?

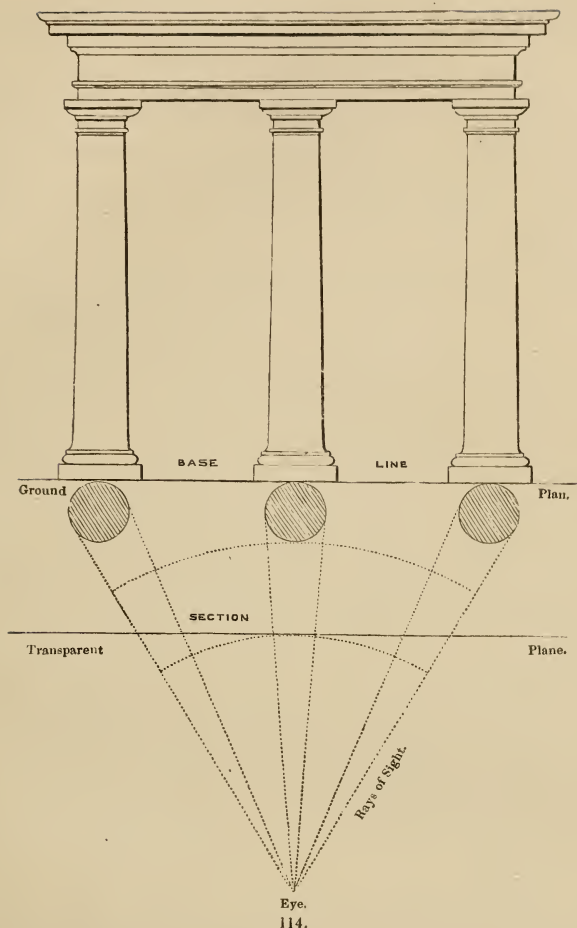
*Ann.* I shall first mark the space of nine inches at the base, on the outsides of the walk, and draw lines from those marks

to the point of sight: this gives me the width of the posts, their *depth* inward being exactly the same as their *width*. The ground plan of each post I find as I did that of the *large square*: as you may see by the left hand post at the base line: from which I draw all the *visible* perpendiculars, or angles of the post. Their heights are determined by drawing the *first* two *posts* which are on the base line, *three feet in height* (by my scale); and from these I rule lines to the point of sight, which will mark the proper height of the rest.

*George.* Your progress delights me!

*Eliza.* As this drawing has proceeded, it has struck me that objects must invariably *diminish* in appearance, according to their *distance* from the eye; and yet I find, that when a *row of columns or posts*, &c. is drawn *fronting the eye*, with the bases *parallel to the base line*, they appear in many pictures to be given *all of one dimension*, whatever may be their various distances from the eye.—Will you explain this matter to us?

*George.* Were you to trace a direct front view of a portico, or row of columns, exactly as viewed from a fixed *short* point of distance (see fig. 114), you would find those nearest the centre would *mark the narrowest*, and those to the right and left, although farther from the eye, would (from their oblique *point of view*) *mark broader* than their diameters, if viewed through, and traced on a glass *directly fronting the portico*. *This has raised some objection to a strict adherence to the laws of perspective*, when such an object of imitation falls under *so great an angle*; because, notwithstanding the true effect would be obtained by following the real situation of the outlines of the columns on the transparent plane, when viewed from a *pin-hole* point of distance, such as the sight hole in the eye-post of the Tripod, they would appear disproportionate when viewed from *any other* point; therefore, to accommodate the subject to our conceptions, and adapt the picture to all points of view, *experience and sound reasoning* have determined us to draw the perspective views of such subjects (when viewed in front) at the *greatest possible point of distance* consistent with a good effect; by which all apparent distortion and disproportion is avoided *without* DEVIATING FROM THE LAWS OF PERSPECTIVE.



*Ann.* I had a question similar to Eliza's to ask, respecting our view of *level lines*; such as the parallel joints of brick or stone walls, when *viewed in front*—must they be drawn *level* and *parallel*?

*George.* *Straight lines, which are level and parallel with one another, and with the base line, will always retain those properties in the respective representations in a picture, when taken at such a proper distance as that the whole subject may be comprehended within a convenient angle and distance in a direct front view; which, I believe, you all understand to be when the*

*principal ray of your eye forms a perpendicular to the picture and the surfaces of the objects of your examination.*

*Eliza.* But, surely, if I stood opposite a long wall, and directed my eye by a perpendicular ray to its side, I could not turn my eye right or left along the joints of brick work, without *seeming* to see the consequent diminution of their size regularly converging to a point, as much as in any perspective view I can imagine?

*George.* Your question gives me an opportunity of clearing a point which has confused many through an imperfect construction, or a deviation from an original position. The proposition you have put *does not admit of your turning your eye either right or left*, beyond the limits prescribed by the transparent plane or picture through which either really or in imagination you view it; *which plane must be kept or considered as immoveable as the object of your study, throughout the whole process of such drawing*,—because a *direct* view was proposed; that is, as much as can be comprehended by the eye within the boundary line, or picture frame, when placed at a *proper distance*—say 40 or 50 degrees of a circle from left to right, of which your eye would be the centre or angular point. Now, suppose that from this *centre* you could form one continued sheet of sight rays along the whole visible length of any one joint of the brick wall, you would find this triangular sheet of rays to be a *perfectly straight surface* (admitting the wall to be well built), and *so it* would be to every joint of the wall, which, being parallel, and *so* seen, *must be so drawn*.

*Eliza.* That which a minute ago seemed a very reasonable question, has now changed its character to that of absurdity. Who, with a grain of thought, would propose looking to the *right* or to the *left*, for a demonstration of a question on a *direct* view?

*George.* And yet some who have imagined themselves greatly your superiors in this science, have maintained the first idea with great obstinacy.

*Ann.* Upon what grounds, brother?

*George.* By *departing* from the accepted and general practice of using a *straight* section line as the edge of the *transparent plane*, and inventing a *curved one*.

*John.* And how would a *direct view* of the joints in the wall appear, if traced on a *curved* sectional plane?

*George.* They would then converge on the right and left; or as the lines of the floor and ceiling do, when reflected by the *convex* mirror. Some have compounded with this deviation from the straight line, and used a *curved section* for the *widths only* of perpendicular objects. This expedient is ingenious, and adapts such objects, tolerably; but unless also the drawing be exhibited on a *curved* surface, it would appear false when viewed at *the right* distance.

Now, by returning to the ground plan of fig. 114, you may perceive that the dotted *curved section* line is *longer* than the *straight* section line, and that drawn *within* the straight section is *shorter*; and if such a drawing should be made by such *curved* section line, and applied on a *flat* surface, it would then be longer or shorter than the true appearance, and admitting that an *intermediate curved section* could be found, equal to the length of the straight one, it would still produce a complex effect, for the heights would retain their proportion to the straight or perpendicular measures of the subject of your study; so that, unless you had a vertical as well as a horizontal *curved section* line, the drawing must be disproportioned in itself; and, *even then, would not be a true representation of what is seen, if drawn on any surface besides a concave one, and viewed only from the central point of such curve*, as panoramas are: all other pictures being finally exhibited on *flat* surfaces.

*Ann.* This brings us to the full and clear acceptation of your first answer on the subject; by which I feel convinced we may safely abide; I mean the *straight section line* which represents the edge of the "*straight and even glass*" always used; and, as you well say, the way all pictures are *framed* and exhibited, except panoramas.

*Eliza.* But then, as we learn that the *perfect effect* can only be seen at the *true perspective point*, even when drawn on the flat surface on which all pictures are exhibited, can *these various methods* have any detrimental effect on pictures when promiscuously hung and seen at various distances?

*George.* Let us abide by the *most simple* rule.



TO DRAW OBJECTS ANY GIVEN HEIGHT AT ANY GIVEN  
DISTANCE.

*Eliza.* Now, brother, suppose I were to begin a drawing, in which I wished to represent several figures, at *various* distances and heights; how should I proceed, so as to be sure they were all done according to nature?

*George.* Can you answer this question, Ann?

*Ann.* If the figures were intended to represent objects all of *one* height, and were placed at equal distances, I should proceed as I did in finding the heights of the posts (fig. 113); but as *various* distances are proposed, I must beg a little of your instruction.

*George.* First settle the size of your picture (fig. 115); then



115.

draw the horizontal line, which, *in a level view*, is at the proportion of five feet from the base line; then determine a point of sight, and draw a line from it to one end of the base line. Now, although this last line and the horizontal line both meet at the point of sight, yet any perpendicular line drawn between these two lines would represent the height of five feet, as exactly as the space between them on the margin of the picture. This may be termed the *converging scale*, by which the height of every object in a scene might be geometrically ascertained: thus, the



life-guardsmen on the base line appears the head taller than five feet, because it is all above the horizontal line. The next figure is *evidently* shorter, because his eyes only reach the horizon, and the flag is found to be about four feet deep by this scale. The third must be taller, as his chin is above the horizon; and the horse's back rising just to the horizon, assures us he is full fifteen hands high.

*John.* Four inches make a hand's breadth, I think?

*George.* And the exact distances of all the figures from the base line, and from each other, may be easily found by the rule given in fig. 113, by which the distances of the *posts* were determined; and it is proper for you to observe, that the *horizontal line* is not required to be any particular height on this occasion; for in the example just quoted, the horizon is much higher than the *posts*: yet their exact heights, size, and various distances, are as well determined as the figures in fig. 115, our present study.

*Eliza.* I perceive that, to find the distances of the objects, the horizontal line must be lengthened, and the point of distance marked properly: from which, rays should be drawn across the points whereon the figures appear to stand, till they touch the base line: and the space between each mark thus produced on the base line would, with the help of a scale, shew us the real distance between each figure, as well as their distance from the base line.

*John.* And pray, sister; how would you measure that space, so as to tell how many feet they were asunder?

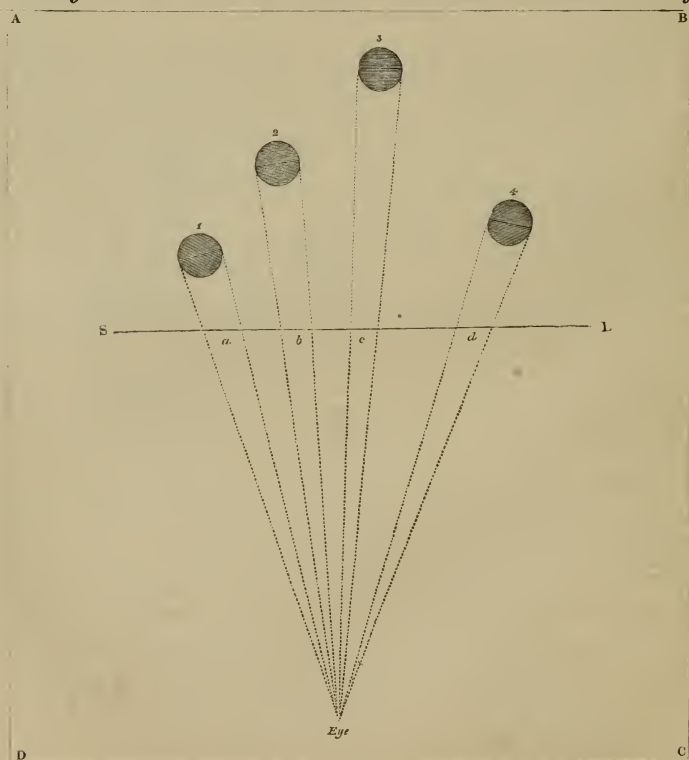
*Eliza.* By the scale of five feet, which is agreed to be the height of horizon from the base line, to be sure: do you not recollect how Ann determined the height of the posts in fig. 113?

*George.* I have traced level lines from the feet of each figure to the converging scale line, for the purpose of ascertaining the heights of any figure, in any part of the picture, at the same distance. For example: Suppose a ladder, placed as far back in the *scene* as the third line; a man's height, on the top of that ladder, would be found by the height of the third perpendicular on our *converging scale*: it would answer the same purpose, if the figures were required to be represented above or below the level surface they are on. This is evinced in the scale of birds

on the wing, as seen in the same diagram; wherein it must be understood, that the diagonal or real distance is not attended to within the limits of a *convenient* angle of view. High towers, which are geometrically parallel, are never drawn narrower at the top than at the base, although the distance be known to be greater from the eye of the spectator to the one than to the other: so the bird that could stretch its wings two feet wide on the top of such tower, which we will say measures forty feet in width, then such bird would certainly occupy a space equal to one twentieth part of the width of the tower; but *all objects* take their measures from their apparent measures at the feet of the perpendicular over which they are found; which *must* happen in some part of the converging scale.

*Ann.* And are all breadths, as well as heights, ascertained by these means?

*George.* The scale of the birds alludes to *breadth* chiefly,



but I will give you a proof in another way: Suppose the figure A, B, C, D, (fig. 116) to be the floor of a large room, and the four circles 1, 2, 3, and 4, *all of one size*, as drawn: then their apparent sizes, as viewed from the word *eye* (where we will suppose you stand to view them), is found on the line S L at the corresponding *spaces a, b, c, and d*. This line S L represents the *edge of the transparent plane*, and is termed the *section line*: through which, were you to view them from the *station of the eye*, as before *proposed*, the rays of sight would pass to the several objects of view, and would determine the width they should be painted; height is not regarded in this instance, but the rule, which explains the method of obtaining *widths*, answers the same purpose for *heights* by a perpendicular section, according to our proof of the height of the figures, the posts, &c., and should be well understood by those who compose groups of figures, and also *single figures*. This is farther explained in fig. 131.

*Eliza*. How perfectly this section line conveys to my idea the edge of a glass set up for one to mark the objects on; the rays from my eye to the edges of the circles, passing across *that line*, appear to go through the imagined glass, as much as when I first went to the window; and I have so accustomed myself to the experiment, that I imagine my visual rays as *absolute straight lines*; like those in your explanatory diagrams.

*George*. This proof of my success in teaching you, is delightful; and your clear comprehension arises from your recollection of what passed in our *first conversation* on the subject.

*John*. We all thank you, brother: now will you permit me to propose a subject for our next lesson?

*George*. Most willingly, if it agrees with our regular progress.

#### TO TAKE AN ANGULAR VIEW ACCORDING TO MEASUREMENT.

*George*. What is to be the subject of our next lesson, *John*?

*John.* I saw a plain building, with a roof which had “*gable*” ends, and I think I could draw it in perspective; but I cannot tell how I should convey *an exact* idea of its proportions.

*Ann.* Come guess at the measurement.

*John.* I think it was about twelve feet long, and eight feet wide, and it looked as high as its length to the bottom of the roof; and the ridge of the roof appeared to be about four feet higher.

*George.* We will take these as the dimensions, and proceed; and I can bring it into the proper course of study, by drawing it as viewed on *unequal angles*.

*Ann.* Will you let it be an example of vanishing points at *different distances* from the point of sight, such as you mentioned after you had explained the angular view of the chess board? (fig. 104.)

*George.* That was my intention, when I said “*unequal*.”—Come, John, to business: first draw a section line, then draw the ground-plan line twelve feet by eight (fig. 117), letting one angle of the plan touch the *section line*, so that the sides of the plan make different or unequal angles to it.

*John.* What length shall I take for one foot?

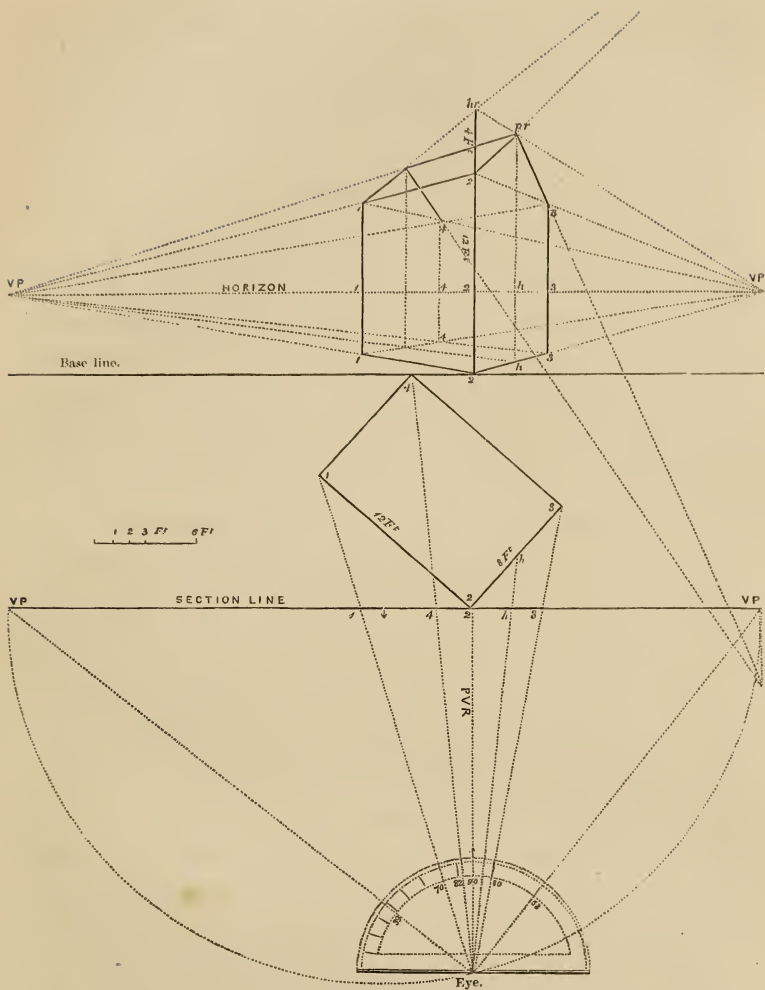
*George.* Let it be a quarter of an inch, or as much more as your paper will allow—remember always to calculate the size of your paper when preparing the scale.

*Eliza.* You mean that twelve quarters of an inch are to represent twelve feet, if I understand you rightly?

*George.* That is my meaning. Now, John, draw the *principal visual ray* at *right angles* with the section line, from the point where the angle of the *plan* touches it, as a perpendicular *let fall* from it.

*John.* O yes, I know *now*, the *principal visual ray* must *always* be perpendicular to the section line: but what length am I to make it for our distance, or point of the eye?

*George.* Our general distance (the length of your intended picture) should be the rule, but we will *now* take a shorter distance, that we may bring the whole problem of *plan*, and *elevation*, into our paper. The distance of the eye-point in the



117.

The "section line" represents the surface of the picture—The line marked "PVR" in this ground plan is the principal visual ray, and is always at a right angle with the surface of the picture.

example will do. Now draw rays from the other three corners of the ground plan to the point marked "eye," and number them 1, 2, 3, 4; then divide the visible *end* of the plan 2, 3, at *h*, and draw a ray to the eye-point. You have now only to find the two *vanishing points*, which is always done by drawing lines,



or rays, from the point or station of the *eye*, *parallel to the two visible and hithermost sides of the plan*, till they cross or touch the section line, and thus such vanishing points are *always* found. This completes the preparation of the plan for our perspective elevation.

*Ann.* Pray, brother, tell me *why* the vanishing points are thus determined?

*George.* Because they tally with their retiring guides, the *visible sides of the figure*; and you have a rule already that determines *all retiring parallels* to converge in *one point*, and if that point is level, it must be in the horizontal line. Now consider attentively what the change would be, were you to direct your eye along either of *these two lines* which are drawn from the word *eye*, parallel to the visible sides of the plan; either V. P. in the perspective drawing would then become the *point of sight*, and the sides of the building would still converge to the same: because *such line* would thus become the *principal visual ray*, and every line that is geometrically parallel to it must converge to the point of sight. Now suppose one of the visible sides of the building to form a part of a street, you know that, when looking directly along the centre of a street, the sides converge to the centre or point opposite your eye, exactly as the posts (fig. 113); and admitting the station to be as we have determined, it would only require you to change the position of the section line to make the V. P. ray (that it would cross at *right angles*) the *principal visual ray*; but then the distance of the eye would be too small from this *removed section line*, which by this time you would know how to remedy, namely, by taking a *greater distance*.

*Eliza.* I should like to draw that perspective elevation, if John will give it up?

*John.* If you please, sister.

*Eliza.* Where shall I begin?

*George.* Draw a base line, just clear above the plan we have finished; then a horizontal line, five feet (by the scale) above the base; and (for the sake of convenience) make the hithermost perpendicular rising from the base line, a continuance of the principal visual ray of the plan below, and number it 2 at

the horizontal line; now take the distance of the longest V. P. from the angle 2 in the *plan* with the dividers, and with this measure, from the 2 on the horizontal line in the *elevation* mark the longest V. P.; then repeat the like for the shortest V. P.

You must next mark 12 feet for the height of the wall from the base, and four feet above that for the height of the roof, on the perpendicular line 2, which is to form the hithermost angle of the figure; and draw lines from this (at the base) to *both* the points marked V. P., also from the mark of twelve feet high, and one from the top marked *h r* (or height of the roof), to the shortest V. P.; then take the length from 1 to 2 on the section line of the plan, and mark 1 from 2 on the horizon of the elevation, and draw the line, 1, 1, 1: then from 2 to 3 on the section of the plan, set off the space from 2 to 3 on the horizon of elevation, and draw the line 3, 3, 3; then from the bottom and top 3, draw rays to the longest V. P.; and from the bottom and top 1, draw rays to the shortest V. P. From 2 to *h* on the section of the plan, mark 2 to *h* on the horizon of the elevation; and draw a perpendicular from the bottom of *h* till it touches the top ray, which gives you the apparent centre and point of the roof at *pr*; from that draw a ray to the longest V. P., which gives the ridge of the roof; then draw a ray from the bottom *h* to the longest V. P., and where this crosses the bottom ray which goes from the bottom 1 to the shortest V. P. raise a perpendicular for the furthest and highest point of the ridge, and draw lines from the uppermost 1 and 4 to it, and from the uppermost 2 and 3 to *pr*. This completes the outline in perspective, agreeably to the given dimensions, aspect, and distance; the dotted lines from the roof are only to remind you of the converging points of inclined planes as explained (fig. 107). Now were you to add to the ground plan the proper marks of the situations of doors, windows, embrasures, or battlements, and ornaments common to buildings, all their respective *widths* would be found on the *section line* according to the preceding; that is, by drawing rays on the *ground plan* from the *point of station* (or distance) marked "*eye*," to the visible angles of *such* doors, &c.; and transferring their measures

from the section of the ground plan to the horizontal line on the elevation (or picture), according to the methods given in the outline before you; and their various *heights*, on the *hithermost perpendicular angle*, when *it touches* the base line, as in the present example;—and as you found the height of the wall to be twelve feet, and the height of the roof to be four feet more, all other measures of heights must be by these determined. But when the hithermost angle of a building does not come to the base line, a perpendicular section erected on the base line must be resorted to for the perpendicular measures; which you will see is done to find the perspective height of the chair. You may turn forward to it (fig. 119), that you may clearly understand me.

To avoid the intricacy of too many pencil lines and rays on your drawing at once, it is advisable to secure them (in *pale* Indian Ink) by *degrees* or classes, descending from general to particular, methodically: rubbing away the pencil lines of what you have secured, to make clear for the next class. The first class should comprehend the general outline of all *exterior* angles; thereby securing those points which must govern the *interior ones*, which in *due order* become the next class to be inked in. The reason for making the outlines of your object with a *pale tint* must be obvious, since the visible evidence of all angles is the meeting of two *masses*, the one *whole* mass darker than the other, and not merely blacker at the edge, as too black an outline would make it. This can instantly be proved by observation on any architectural object, and is one of the elegant accomplishments of a draftsman, because it imitates a *natural* effect.

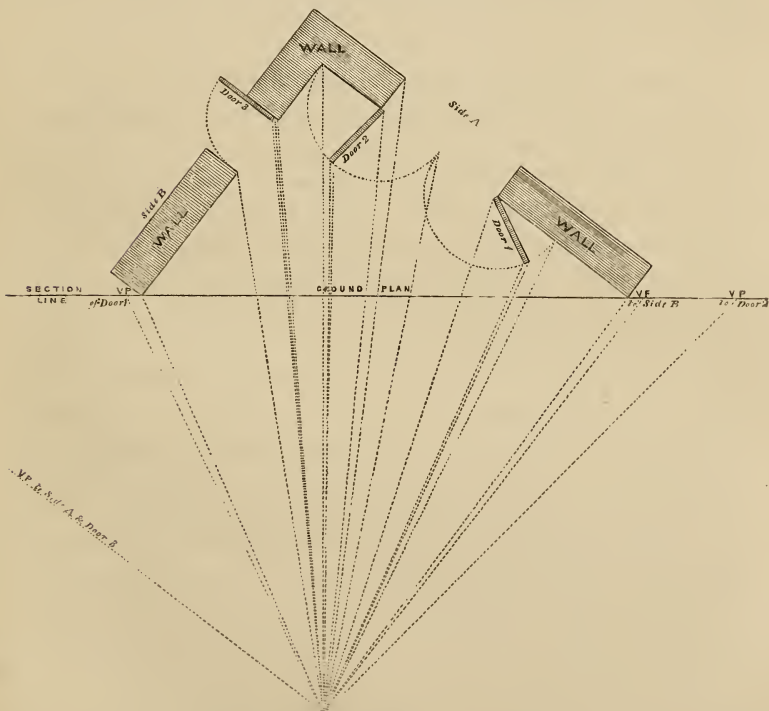


#### ACCIDENTAL SURFACES AND POINTS.

*Ann.* The folding doors that divide the two parlours, sometimes stand open promiscuously, one more than the other; will you teach us how to draw them properly?

*John.* All the doors are open sometimes; this will be a good lesson for us.

*George.* Study fig. 118 attentively, and proceed, as nearly



118.

as you can, according to the rules and observations given for drawing fig. 117. Begin, and I will assist you, if necessary.

*Eliza.* I see the ground plan must first be completely drawn, and the station of the eye determined, for from thence, of course, all the rays of sight must be drawn, one to each terminal point of the plan: indeed the whole of the *plain* part of both plan and perspective view, is clear to me by fig. 117; but I doubt my being able to proceed to the additional matter.

*Ann.* Then, sister, do as much as you understand; copy the plan entirely, and draw the plain walls and the spaces for the elevation; and then ink them in, and I will try my skill with the doors and circles, if you will permit me.

*George.* I shall be very proud of my pupils, if you complete the work between you.

*John.* What are these half circles for? and why are they put in perspective as you drew the perspective of the *oval*, instead of by the method in which you have taught us to draw *circles* in perspective? (fig. 111.)

*George.* The different manner of putting them in perspective is only to show you that *either* mode produces the effect. I hope your sister will answer your question clearly as she proceeds.

*Ann.* I observe by the ground plan that each door converges to a different vanishing point. These I must mark on the horizontal line of the picture, according to the method for setting off the principal vanishing points; which is clearly provided for in the ground plan, because the lines that are drawn parallel to each door, as also to the sides of the room on the ground plan, furnish the V. P. of each on the section line, where each of those parallels touch or cross it; according to our *general* rule.\* The geometrical semicircles at the base line, must be drawn as guides to the perspective ones in the picture.† Now you will see, John, that the plan shews very plainly that these semicircles are supposed to be produced on the floor by the track of the outer edges of the doors, as they move on their centres (the hinges); so if I take the width of a door for a radius, and set one foot of the compasses on the point over which the centre of the hinges is, and

\* Page 89, second line from bottom.

† The respective V.P.s of the doors determine the perspective lines for the tops, bottoms, and panels of them; and their *apparent* widths are found on the section line; it is, therefore, *not absolutely necessary* to draw the circular track of the doors in perspective, although a proper rudiment in the art.



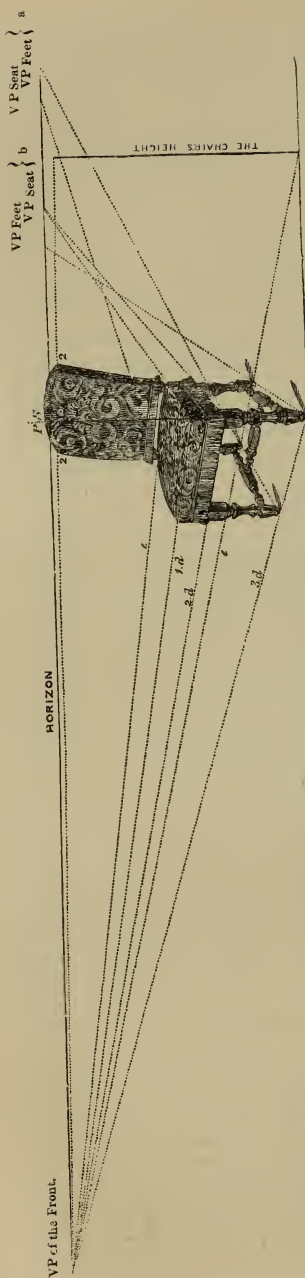
describe a half circle (as on the plan), I may mark the proper width of the door *at any* degree of opening.

*John.* But how do you determine the right size of those circles at the *base line*? they are much larger than those on the *plan*.

*Ann.* I draw lines from the V. P. of the side B, one through each point of the side A, where the doors hang, till they touch the base line; and as the space between them on the base line represents the *whole* opening proportionately, I divide this space in half, according to my example, and take it as a width of a door, or radius for the geometrical half circles below the base line; and the quarter of a circle at the beginning of the side A, directs us to the perspective width of each door, by the ordinates O, O, fixing the perspective extent from the side A, of the circles on which the outer edges of the doors must move. Now, George, I must beg *you* to explain the lines and angles that are in and about these semicircles.

*George.* You are to observe, that the geometrical semicircles on the base line are to lead you to a correct formation of the perspective ones on the floor in the picture; we therefore thus produce some few correct points (as ordinates) to guide us; you did it (fig. 112) for the *ovals*.

*Ann.* Thank you, brother; I see that I can complete it now. I must draw the straight line that touches the lower extent of the semicircles, then the perpendiculars at the centres and outside points of each of them, then the diagonals from the centres to the right angles, crossing the semicircle, and where these cross I have points to draw the other level line and all the remaining perpendiculars; and where those in the two half circles touch the base line I draw lines to the V. P. of the side B; and where the two perpendiculars in the quarter of the circle touch the base line at O, O, I draw lines to the V. P. of A, obtaining a perspective representation of the *oblong square* which the original semicircles produced; and by the guidance of the points which correspond with those on the original half circle I am enabled to draw the *perspective* semicircles; and from these I draw the perpendicular lines that represent the outer edges of the doors, and draw the bottoms and top extremes of the doors to their proper V. P.s, as marked on the horizontal line of the example.



## THE CHAIR.—(FIGURE 119).

This is drawn on the principle of Figure 117, only with more lines and points.

*John.* Now, brother, as we have learned to set the doors open, we shall want some furniture for the rooms.

*George.* A chair, *well understood*, will give you a universal rule, it being an irregular figure. The example (fig. 119), with what you ought to know of the principles of fig. 117, will sufficiently explain the process of drawing it. Come, sister Ann, you will begin this drawing, and explain what you do.

*Ann.* I think I must first draw the ground plan according to a scale properly calculated, to admit the whole drawing within the compass of my paper.

*John.* And what rule will you calculate by?

*Ann.* As I perceive the station of the eye is cut off in this drawing, I must find it by continuing the rays tending towards it until they meet in that point which will shew the length of the example to be about eighteen feet, and the width fourteen feet; now as my paper is much larger than the print, I may make my scale so that one *foot* may be somewhat less than one *eighteenth* part of the length of my paper.

*George.* I hope, John, you will remember this very essential point, *of calculating the extent of the space you are drawing on*; and make it a *general rule* to do as your sister has done.

*Ann.* I shall first draw the section line, and the principal visual ray, and then determine the P. D.: then begin the ground plan of the chair by drawing the lines that form its front and back, marking their lengths by the scale; but as the back part is not so wide as the front, the central line *c c* must be made to mark the width at the back part equal, which enables me to draw the two sides, *a* and *b*, and completes the geometrical outline of the seat. Now I must find the place of the back feet, and the top rail of the back over them, *beyond* the back line of the seat.

*George.* Which you may observe, you might as easily do by measurement from a real chair, as from the problem before you.

*Ann.* I thank you, brother ; I quite understand that, and I think I could as easily make the perspective drawing from a *real* chair as from the print, as I find my scale is the same to my *drawing* as the two foot rule is to a *chair*; and it would only require to set the chair in the same aspect and the distance specified in the example. I now proceed to draw all the visual rays from the EYE to the terminal points and angles of my ground plan; and the vanishing point of the front of the chair by a line from the eye to the section line parallel to the front of the chair. Why have two V. P.s for each side of the chair?

*George.* You will observe, that the back of the chair, being much wider at the top than at the feet, is not parallel, while the front legs are ; now as the *rule for finding V. P.s of any sides is*, that they must rise from a point produced on the section line by a line drawn from the eye to the section line in a parallel direction to such side, you will readily discover the necessity of those additional V.P.s by *practical* investigation.

*Ann.* Well, I will first draw the parallels of the two *visible* sides of the seat *a* and *b*, to fix their V. P.s on the section.

*George.* Now you see the V. P.s for the *feet* are wanting—lay your parallel rule on the *plan*, parallel successively to the side of the front legs, and to the two sides of the back feet, marked 1, 1, and you will find the two V. P.s of the feet by ruling the parallel line from the eye to the section line.

*John.* And now we have the *plan* complete.

*Ann.* In drawing the elevation of the chair, I must begin as usual with the base line, and then draw the horizontal line ; which I should like to set a little higher than that in the print, just to clear the top of the chair.

*George.* Do so, that will be an improvement; but you must still draw the ray that passes on to 2, 2.

*Ann.* I shall now set up a perpendicular from the base line to the horizon, as the hithermost angle of the chair, and the P. S. will thus be over the P. V. R. of the plan. Now I mark the V. P.s on the horizontal line according to their distances from the P. V. R. of the plan, and then mark the height of the upper and under edges of the seat on the *central* perpendicular, and draw the three lines, *d* 1, *d* 2, *d* 3, to the V. P. of front, and

repeat them on the side *b* to the proper V. P.s of seat and feet; next I take the space on the section line from P. V. R. to the ray that goes to the back corner of the seat, side *b*, and mark it on the elevation from the central perpendicular to the right on the retiring seat and feet lines: from the points thus obtained I draw the two *back* lines of the seat and feet *e, e*, (that correspond with the front) to the V. P. of front; then I apply to the section line for the width of the front of the seat, mark it from the central perpendicular, and draw the outside angle of the left front leg, from *d 3*, to *d 1*; then I repeat the lines of the *3 d e*, back to the V. P. of the side *a* for the left side of the chair.

To obtain the height of the chair-back, I continue the lower line *e* down to the base line, and there set up a perpendicular the measured height of the sides of the back, when a line to V. P. of front determines the perspective height.—The width I gain by 2, 2, on the section; then I sketch the line of the top and the middle part, to complete the skeleton of the elevation.

*George.* When you draw the two rails under the seat on the sides *a* and *b*, you will find that they must not converge to either the V. P. of the seat or feet, but to an intermediate point, because they lie between a greater and lesser angle. To be *extremely nice*, their V. P.s should be given.

*Eliza.* I think, brother, that would be clipping the wings of genius too close; for surely if many will try to draw a whole chair without any other rule than their eyes, we may venture to draw one intermediate line by the guidance of a scientific one on each side of it.

*John.* Oh, any body that can *draw* could easily finish the chair now, without any more perspective rules. I never thought of the learning which was requisite to produce the *originals* from which I used to copy.

*George.* Now, John, you may *furnish* the rooms we have drawn to your own taste, as soon as you please.

*Ann.* Only let me have the pleasure of finishing the first chair, as I have begun it.



## THE DOUBLE CROSS.—(FIGURE 120.)

*Eliza.* This lesson falls to my lot.

*John.* I think it is like fig. 117.

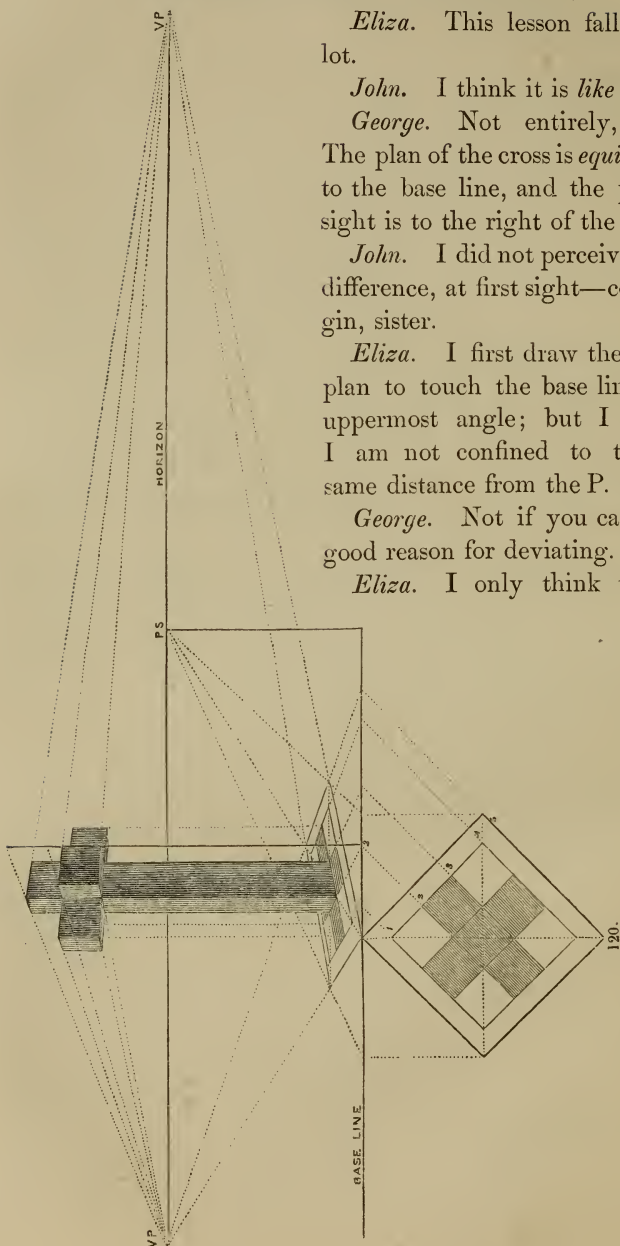
*George.* Not entirely, John. The plan of the cross is *equi-angular* to the base line, and the point of sight is to the right of the figure.

*John.* I did not perceive all this difference, at first sight—come, begin, sister.

*Eliza.* I first draw the ground plan to touch the base line at the uppermost angle; but I suppose I am not confined to the very same distance from the P. S.?

*George.* Not if you can give a good reason for deviating.

*Eliza.* I only think the *per-*



*spective rules* of this problem would not require *one particular situation* of the object.

*George.* You are so far right; but you must bear in mind the rule you have received for viewing objects under a *convenient angle*, so as to avoid the appearance of *distortion*, and to produce the most agreeable view. Suppose you do take a different angle,—which would you choose, a greater or a less?—that is, would you place the plan nearer, or further from the point of sight?

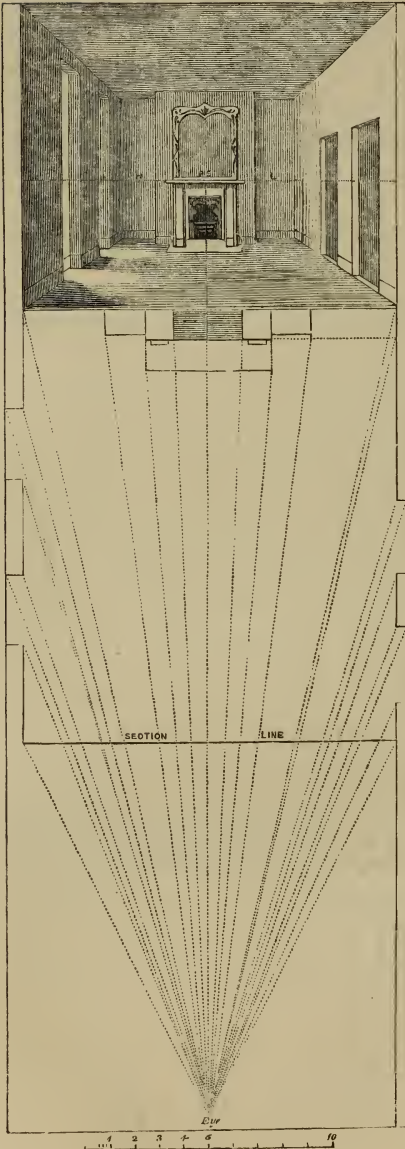
*Eliza.* I have not considered that, so I will follow the example, if you please.

As soon as I have made the two perpendiculars from the right and left angles of the plan to touch the base line, I draw the horizontal line, and mark the P. S. in the centre, between the two V. P.s; and as these are equidistant from the centre P. S. of the picture, each V. P. represents the distance of the eye from the surface of the drawing (see fig. 104). Now I continue the three points of the plan that touch the base line, up to the P.S.: then I carry on the lines 1, 2, 3, 4, 5, of the plan, up to the base line, and from thence up to the left V. P.; the *sixth* line is done from the uppermost angle of the plan. I perceive it is *that horizontal line* which *crosses* the centre of the *perspective* plan, that gives me the points from which I draw the remaining perspective lines of it to the right hand V. P.—Now I set up the central post on its proper central square on the perspective plan, and the arms of the cross over their respective squares, according to the example.

*George.* You will find that the perpendicular which is raised on the base line at 2, will enable you to mark the top and bottom lines, 2, 2, of the cross arms equal to their width, by taking their absolute width from the diagonal of the centre of the plan with the *dividers*, and marking both points as high upon the perpendicular as in the example, according to the proportion of your drawing.

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## A DIRECT VIEW, INTERIOR.—(FIGURE 121.)



*John.* I want to know, brother, whether I might draw a *direct view* of the drawing room by any other means than those we used when we drew the perspective view of the posts, fig. 113? because I like the way you taught us to describe the angular view of the room *with the open doors* by giving an absolute *ground plan*, as also with the chair, fig. 119, as well as the angular view of the house, fig. 117.

*George.* I was in hopes that the several instances you have mentioned would be sufficient assurance to you that you not only “might” but must draw the geometrical plan when you want the perspective of a whole room according to the method you have required.

*Ann.* What! must we draw such a plan as an architect does to explain a building?

*George.* Only the *visible interior line*, denoting all that the eye could discover when at the distance and station you may choose for your view.

*Eliza.* I hope, brother, you will give us one example.

*George.* We will make the drawing now, if you can all attend.—Come, John, see that *this* floor is a perfect parallelogram; and measure the full length and width.

*John.* It is eighteen feet long and fifteen feet wide.

*George.* We must have the height too.

*John.* Then you must measure it, for I cannot reach so high.

*George.* It is twelve feet high.—Now add the length, width, and height together, and the whole makes forty-five feet; so we shall want a surface forty-five FEET LONG to make the drawing on; that is, the length for the plan, the width for the point of distance, and the height for the elevation.

*Eliza.* That sounds very impracticable, brother; but you know we have *at last* found out the secret of the *proportionate scale*, and shall want no longer surface than this sheet of drawing paper, which, I find, measures twenty-four inches long; so, by making half an inch answer for the measure of a foot, we shall have one inch and a half paper to spare, that is, three quarters of an inch at each end.

*John.* Well, then, I'll draw the scale if you please, about half an inch from the bottom;—it will be clear of the drawing there, you know.

*George.* Now be attentive, and begin the drawing. First draw a line three quarters of an inch from one end of the paper, and call that the “base line;” then, as the *width* of the room is fifteen feet, we shall take that measure for our point of station which we are *supposed* to view the room from; therefore at fifteen feet distance from the base line, draw your next line parallel to it. This line marks one end of the floor, and will be our section line. Now eighteen feet being the length of the room, draw a line eighteen feet from this line, and parallel to it; this gives you the long extent of the room,—so much for the length of ground plan.

Now draw a line twelve feet above this line, for the *height* of the room. Now we must have a central line, which will be the P. V. R., from which we mark off seven and a half feet on

each side, to give the width of the ground plan, and, at the same time, that of the elevation, or view to be drawn. Now measure the width of the two doors and the remaining spaces on the right side of the room, and mark each correctly on your ground plan according to your scale, and the same on the other side for the windows, as in your example; so also you will proceed with projections of the fire-place, which will strictly correspond with the example; wherein I have given you the fewest angles possible, that you may not be burthened with a multiplicity of rays, while learning the principles.

*Ann.* Thank you, brother; I think we can finish the rest without giving you the trouble of drawing all the rays, and of referring their marks from the section line to the horizontal line of the perspective view.

*John.* But you must draw the horizontal line first—what height must it be?

*George.* Draw the horizontal line on the elevation, five feet above the base line; and when you have drawn rays from all the visible angles of the ground plan to the point of view, you may mark them off from the section line, on the horizontal line, very correctly and expeditiously, by folding the plan outward on the section line; and carry this edge up to the horizontal line, placing them correctly together, and touch the end of each ray off on the horizontal line at once.

*Eliza.* But I fear the crease, or fold, would hurt the surface of the paper.

*George.* That is not of much consequence, because artists only draw the ground plan as a means or material towards their object, which is the *perspective* of the room; but, to avoid the fold, take the straight edge of a slip of drawing paper, and lay it to the section line, and mark all the rays on the edge of the paper, which you can then carry up to the horizontal line and repeat as before proposed.

*Ann.* This is a much more expeditious way of working than doing it with the dividers, a ray at a time, as we did in the other *drawings*.

*George.* But expedition *too early*, weakens both roots and fruit. Now mark the heights of the doors and of the plinth on the perpendicular marginal or section line, and rule towards



the point of sight; and the same on the other side for the heights of the windows, &c.: and, when carefully inked in, this very plain specimen is finished; which, I hope, will be quite sufficient to *introduce* you to a more elaborate work of the same kind.

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On finding the Vanishing Point of Architectural Back Grounds to be out of the Picture, contrary to the foregoing rules.

*Ann.* By the help, brother, of what you have taught us, I have made some observations on various prints and paintings, which do not accord with your rule—"that *the principal visual ray must establish* the point of sight, and BE WITHIN THE PICTURE."

*George.* There are so many prints and pictures with bad perspective, that I have hoped to enable you to avoid such errors, without reference to any particular picture: do you recollect any one?



122.

*Ann.* The plinths of the columns which are in the whole-length portrait of George III, by Gainsborough, have (according to his nephew's print of it) *one side* parallel to the base line of the picture; and the *visible* retiring sides do not *converge* to any point, but if they did, it must be *far out of the picture*, to the spectator's left hand (see fig 122).

*John.* Then you know that must be wrong; for, according to figs. 107 and 109, and their explanations, those retiring sides of the plinths must establish the *point of sight*, because

the front sides of the plinths *are parallel* to the base line of the picture.

*George.* Yet there is a certain class of great geniuses (whose meritorious beginnings fill them with great commissions before they are scientifically qualified) who succeed just well enough to sustain their popularity, and increase the number of their employers to their disadvantage *as artists*. Gainsborough was of this class: his genius was great, and his works evince a fine *conception* of the truly picturesque, CHIEFLY IN HIS LANDSCAPES; but the instance before us is an evidence that he had not a *mathematical* knowledge of perspective; or was unpar-donably negligent, where one should suppose he would have put forth all his diligence and knowledge: and had he only been so far attentive to the *architectural* part of the picture, as to have evinced *any* point of sight for the whole, I should have tried to apologise for the digression, by allowing him to fix the point of sight out of the picture, with an ingenious intention of holding the spectators to one side, that His Majesty might appear to have room to pass on out of the picture, without coming into direct contact with them.

*Ann.* Yes, that indeed would have been at least *aiming* at “a grace, beyond the rules of art.”

*George.* Few, very few, succeed in the attempt, sister, for I believe science to be so extensive that no flight of *mere* genius can go beyond it; the fact is that the mathematical intricacy which has enveloped the beautiful handmaid of truth (*perspective*) hitherto, has obtained her but *too* few sincere votaries; still, many have gained very distinguished fame for their works, who appear to have been either indifferent to, or ignorant of, the integrity of perspective, and I know not what reasons they could advance for the error.

*Eliza.* Are we quite certain that their digressions are “errors”? May we not admit that what we find contradictory to the knowledge we have attained, might possibly be proved to be preferable to it?

*George.* I admire the liberality of your query; but if a whole subject is to be described, as *one* eye conveys it to perception *all at once*, there cannot possibly be *two* points of sight

for what is fully and entirely comprehended under *one*; and as for allowing *that point* to be so stationed as to make *all* the visual rays fall *obliquely* on the surface of the picture, whatever may have induced the practice, *we* must decide that it is not within the mathematical bounds of perspective as a practical art; and it has not appeared quite certain to me that any real advantage can arise through a departure from its established laws.



123.

*John.* I really believe that the print of the Duke of York by Jones, after the original by SIR JOSHUA REYNOLDS, is liable to the same considerations as Gainsborough's King George the Third; for *the point of sight* to the architectural part, must be far to the left of the spectator, when viewing the picture perpendicularly (see fig. 123).

*George.* Your remark is just; and such an instance of deviation from rule, by so eminent a master, can only be accounted for, *by me*, according to what I have already explained, which, I fear, is not sound enough

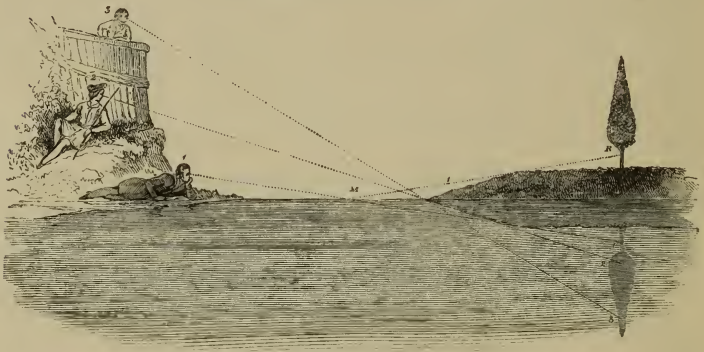
to legalise it into a scientific form; because the very same sort of deviation is in the back ground of Sir Joshua's fine picture of the "Infant Academy," as you have remarked in the two preceding instances, the licence for which is beyond the bounds of mathematical integrity.

## ON REFLECTION.—(FIGURES 124—130.)

*Ann.* I have some general ideas respecting the reflection of objects on water: are we to have any particular rules for this?

*George.* In this department of our pursuit, you may establish one clear and general idea as a clue to the right understanding of reflections, which is, that **THE REAL object is inverted to our view.** We must first consider water as a perfect mirror.

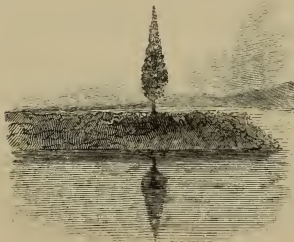
A Profile of the Views the Three Figures have of the Tree, and its Reflection on the Water agreeable to their various heights.



124.

Figure 124 is a geometrical *profile* of a single tree, on the level bank of a river; and on the opposite side are three figures, supposed to be studying reflection: they are placed at various heights, for the purpose of shewing you the different effects of the same object; for you

As viewed by the 1st Figure.



125.

will be convinced, by their respective views of the self-same scene, as expressed by figs. 125, 126, and 127, that the best effect is as much dependent on a *proper height* of the spectator's eye, as on a well-chosen position to right or left.

Now observe, the ray from the eye of the figure who is lying on the ground appears to pass on *into* the water, at M, to the tree; but you must be certain it does not, and that there is no tree



As viewed by the 2nd Figure.



126.

The point R, is the first visible point of the reflected tree, owing to the interposition of the bank. The eye of the observer (No. 1) being on a line with the level part of the bank obtains an entire view of the real tree, according to the second diagram (fig. 125).

*John:* And I suppose Nos. 2 and 3 are to be explained in the same manner?

*Eliza.* Yes, undoubtedly: now

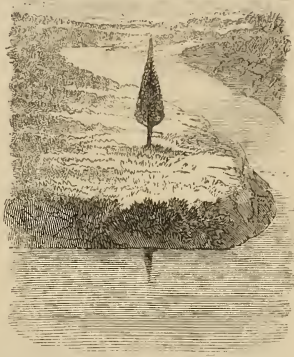
I clearly perceive the difference there must have been in our drawings, had we taken the view from the window, according with the situations given. See fig. 98.

*Ann.* We are so nearly of one height that the variation, as respects the horizontal line, could have been scarcely perceivable. But with regard to view, right and left, yours and John's must have been very different, because each could see that which the sides of the window prevented the other from seeing; but these three men appear to be several feet above each other.

*George.* This which may seem to have been a digression really is not, because the observations which have been made, arise out of the subject for explanation. The three different horizons of figs. 125, 126, and 127, will shew you, as I before observed, that the proper height of the spectator's eye is of the utmost importance to the best effect of any scene; for the

*inverted under* the surface of the water. The point R, on the real tree, is what you see *reflected* at M, because it forms an equal angle with the ray from the eye, to that surface of the water line; and also with the apparent continuance of that ray to that part of the trunk of the reflected tree, which corresponds with R, on the real tree.—

As viewed by the 3rd Figure.



127.

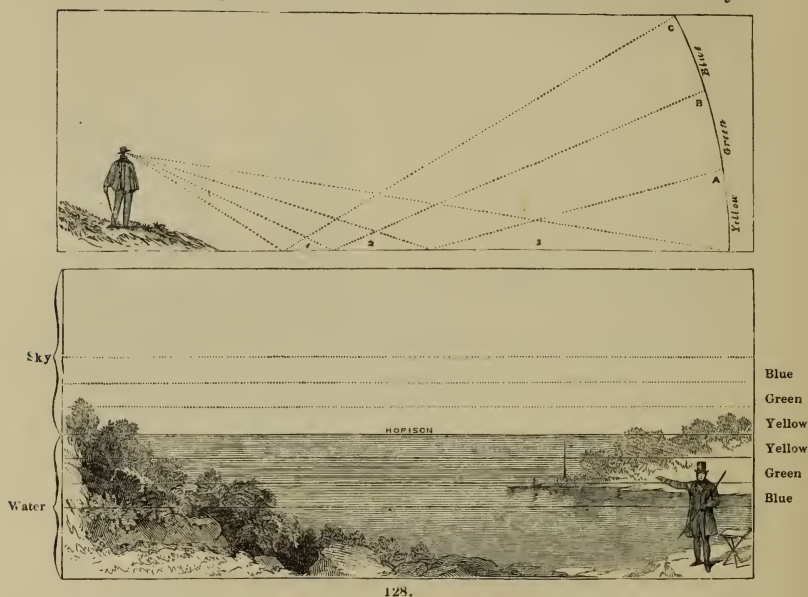


examples before you are very unlike to each other, from the single circumstance of being viewed from *various* heights.

*John.* I am very impatient to hear the explanation of figure 128.

*George.* That is contrary to a piece of advice I gave you at the commencement of our studies; but I am ready, if you clearly understand figures 124—127.

*George.* Figure 128 is a *profile* intended to shew you

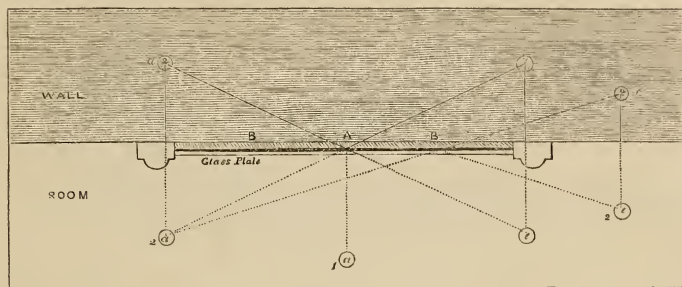


geometrically the precise situation of the colours of the sky, when reflected on smooth water. You are to admit that the curved line is to represent the sky, apparently meeting the water; it is divided into three equal portions of colour—yellow, green, and blue, according to the example. Agreeably to this, the figure on the opposite side would see blue on the water, in the space 1, green in space 2, and yellow from space 2 to the bottom of the curved line of colours, which is marked 3, and to the figure, appears (I presume) to be the horizon. Although these three spaces are so unequal to us when viewing the *profile*, they must appear *equal* to the eye of the observer. In the lower part of the figure I have shewn this as YOUR view of the scene.

The Rule, “*That the ray of reflection, and the ray of incidence, always form equal angles from the surface reflected on,*” has been found invariable.

*Eliza.* Will you please, brother, to favour us with some further explanation of this rule?

*George.* If you will pay due attention to fig. 129, you cannot fail of comprehending the rule. Imagine all the shaded part



129.

to be the ground plan of a wall or side of a room, against which is a looking-glass (A B), and all the rest of the space is considered the floor of the room; the small circles are stations, marked 1 *a*, 2 *a*, and 1 *e*, 2 *e*, where you are to place yourselves according to your initials, that I may explain this matter.

*Ann.* 1 *a* signifies my first position, so I shall go and stand directly opposite the glass.

*George.* And pray what do you see *in* the glass?

*Ann.* Myself, to be sure, brother.

*George.* And you think, I presume, that the reflection of your person is as far *beyond* or *within* the surface of the glass, as your distance from it?

*Ann.* It appears so.

*George.* Now consider, the glass is about one-eighth part of an inch in thickness, on which is an opaque body of quicksilver, through which nothing can be seen; and if it were not so, the glass hangs close to a solid wall: but this we need not endeavour to penetrate, as I see you are already convinced that the subject of our inquiry is to be found on the surface of the glass.

*Eliza.* Pray, brother, is it the inner or outer surface of the glass that reflects the object?

*George.* Waiving (in our present pursuit) the laws of *refraction*, you are to understand that it is the inner surface which, forming a perfect polish to the coat of quicksilver, makes that, rather than the glass, perform the office of a mirror, the glass only serving as a proper surface or varnish to the metallic body.

*John.* Then it is *in* the glass we see ourselves? Pray is it proper to say, “reflections in the water”?

*George.* No: reflection is returned or conveyed to the eye from the *surface* of the water; you must *therefore say*, “reflections on the water.”

*Eliza.* What is Ann standing opposite the glass for?

*George.* In order to be convinced how the ray of reflection and that of incidence *always* form equal angles from the surface on which the object is reflected. You must observe, Ann, that while you are viewing yourself in the glass the ray of incidence and that of reflection are one and the same ray, passing first from your eye to the mirror, and back again to your eye by the self-same ray: therefore, both are at *equal angles*, that of ninety degrees from the surface of the glass.

*Ann.* Then this corresponds with the *central* or *principal* visual ray in perspective?

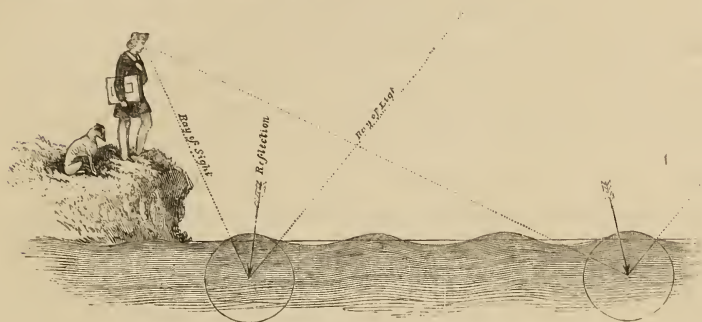
*George.* Precisely the same in this particular instance. Now, Ann, take a station, so far to the left as not to see your own reflection on the glass, as at 2 *a*; and Eliza, take a similar opposite station as at 1 *e*; now direct your sight towards the glass, and you will see each other's reflection on the point A, and your rays will be at equal angles from the plate or surface of the glass.—Now, Eliza, change your station to any other part of the room, so that you can still see Ann's reflection. Suppose you move to 2 *e*, you will then find the point of mutual reflection removed on to B; but the angles of the visual rays are as equal to each other as when you stood at equal distances from the glass, as you may prove with the protractor.

*Ann.* I clearly perceive, and doubt not, when we have made *more experiments*, we shall find it a general rule.

*John.* Now, brother, you have certainly explained the laws of reflection on flat surfaces, but can you shew us how to find the glittering points of waves?

*George.* I am prepared here with a gentle *uniform wave*, for the convenience of making the diagram as intelligible as possible; and let us presume that every wave is a segment of some circle; which admitted, you have only to study the profile (fig. 130).

*Eliza.* I think I can explain it.



130.

*George.* Please to proceed, then, sister.

*Eliza.* The level line is to represent the medium of the surface when perfectly calm, above and below which you produce the curved lines as the waves, and form complete circles out of the two extreme waves.

*John.* I know how to do the rest.

*Ann.* Come, shew us.

*John.* In our Fifteenth Problem of Practical Geometry, we learn how to bisect an angle.—But I interrupt you, Eliza; go on.

*Eliza.* Then you draw rays from the centre of the circles to the eye of the figure, and also towards the luminary. These rays form certain angles, which are *bisected*, and where the bisection crosses the wave, is the glittering point of each wave, as supposed to be seen by the figure on the bank.

*Ann.* And would that certainly be the glittering point to nature?

*George.* Yes, as a general rule; but there are exceptions which, to demonstrate exactly, would (as regards perspective) give us more trouble than benefit. You may prove the certainty of my scheme by a very simple experiment with a

shining cylinder, a lighted candle, and a square table. John's little mug there will serve for the cylinder.

Draw a pencil line correctly across its centre at bottom, and mark each end of the line up the sides, as a guide to place it diametrically even on a line which you must make precisely across the middle of the table, by chalking a strong thread, and snapping it to leave a mark. Place the marks of the mug on this line, and let some one hold a candle to one corner of the table whilst you place your eye to the other on the same side, which must be that which would have one end of the chalk line between the two corners thus occupied; then direct your eye to the mug or shining cylinder, and you will find the glittering point exactly over the line it is placed on; then move the mug to any part of the line, making a greater or a less angle between the eye and the candle, and you will still find the glittering point directly over the line.

*Ann.* Oh, this is very satisfactory: you see, Eliza, if rays were drawn from the two corners of the table to meet in *any* part of the chalked line, they must form equal angles, and we have proved that the glittering point was always on the line—nothing can be clearer.

*Eliza.* And, as a confirmation, we find that this central line of chalk is the bisecting line of all the angles that the shining part of the mug formed, with the two corners of the table, as we moved the centre of the mug along that line.

*John.* Would not this give a rule for painting the shining parts of columns?

*George.* Yes.

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#### THE PERSPECTIVE OF SHADOWS EXPLAINED.

*John.* What are the rules for drawing shadows?

*George.* The rays that determine the forms of such shadows as are produced by the obstruction of *candle, lamp, or torch-light*, DIVERGE in right lines from the luminary. But shadows that are produced by the interception of SUN RAYS are treated *as* PARALLEL.



*Ann.* Is not that the most perfect *treatment* of sun shadows?

*George.* Yes, on such subjects as ocular perspective can comprehend.

*Eliza.* Then why did you say "*treated*" as parallel?

*George.* Because the sun's diameter being computed at about one hundred times that of the earth, nothing but our immense distance from the sun (near 100,000,000 of miles) could make the *parallel* treatment of his shadows produce a true effect.

*John.* What, brother, a hundred to one, and yet no diminution of shadow!

*George.* Apparently, none.

*John.* Come, brother, this cannot be all the explanation you intend to give of these shadows; we are all attention.

*George.* Figure 131, A, will lead to an explanation. Suppose a round pole to be fifty feet long, and six inches and a quarter diameter at its largest end, and one sixteenth part of an inch diameter at its smallest end; *this pole* would be near enough to the proportion of that *cone\** of straight rays which is formed in the intermediate space, and by the extreme circumference of the two bodies—the sun and the earth. Now preserve in your mind the proportionate comparison between the gradually tapering shape of the proposed pole, and the cone of sun-rays; and observe, by the proof given in fig. 131, A, (for that is the same proportion) how imperceptible the diminution would be: for on sawing off half an inch in thickness at the base of the pole, like a wheel, you would not be able to discover the smallest difference between the diameters of the two sides, while the proportionate length of the edge, or thickness of this wheel, would be to the length of the pole, as eight *diameters* of the earth are to the space between it and the sun. This will surely prove that no *visible* variation from the parallel appearance of sun shadows can be expressed from any object that can be comprehended within the practical rules of perspective, when viewed parallel with the horizon; and when they are viewed in any other direction, they must be treated as the perspective of any other parallel forms would in the like situation. See the shadows of B, C, and D, fig. 131.

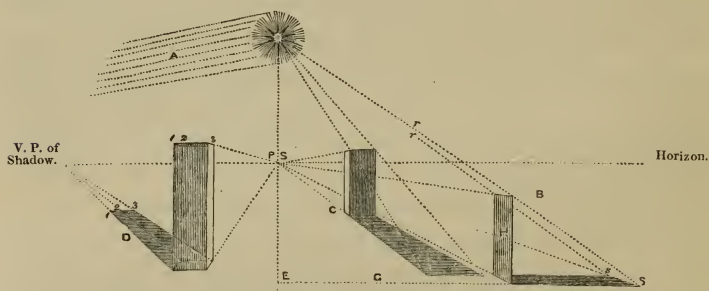
\* It is rather the *frustum*, which means a part of a cone; a *whole* cone terminates in a perfect point.—See figure 44.

*Ann.* But I have often seen beams diverging larger and broader, as they descend from the sun, spreading like a fan: could these possibly be parallel or smallest at those parts which appeared farthest from the sun, which appear broadest to my view?

*George.* Yes, sister; you know the lines of the chess-board to be parallel, yet you find its true perspective appearance to be as represented in fig. 101 (*turn back and look at it*). Now you have only to suppose the point of sight in that diagram to be the sun, and the rows of squares to be sun-beams, and you can instantly see that sun-beams may be as parallel as the retiring lines of the chess-board.

*Ann.* I am quite convinced, brother, and much obliged to you.

*Eliza.* Now, if you please, brother, I will draw fig. 131, B, the upright panel marked H, which has its shadow parallel to the horizon.



A represents the proportionate diminution of the Sun's rays towards the earth, according to the following scale:—The earth 1; the sun 100; their distance asunder 10,000.

131.

*George.* You will first draw the panel H in perspective, without regard to its shadow; then draw the base line E G S, touching the lowest point of the panel; then let fall a perpendicular from the point of sight to this line, forming the point E, and continue this perpendicularly upwards to the point you choose to determine for the height of the sun. From which point draw the first shadow ray *r*, as in the example, touching the top of the hithermost side of panel H, and terminating on the line E G S at S; from S draw a line to the point of sight, which will determine the perspective of the shadow of the top panel. Now

draw the furthest shadow line parallel to E G S, and you will find that the second or under ray *r*, by passing parallel to the first *r* ray, and touching the furthestmost corner of the top of the panel, will terminate at the second S, and complete the work according to the presumed position of the sun, which is vertical in the *direction* of E G S, as perpendicular to E: yet the sun itself is not absolutely vertical to E, but at its proper distance to the *left hand*, and at the height to which the ray *r* would ascend, were it continued in its present direction till it reached the sun; and because all perpendiculars that could drop from the ray *r* would fall on the base line E G S, all forming right-angled triangles with the base E G S and the original ray *r*, proportionate to each other, we shall find our work correct, by considering the sun *perpendicular* to E.

*Ann.* Why must the end of the shadow tend to the point of sight?

*George.* Because the top of the panel being level and parallel with the surface on which its shadow falls, they must *both* converge to one V. P. (according to the *rule* you have already received), which V. P. is *here* the P. S.

*John.* Next comes C, fig. 131. Shall I draw the post in perspective, for you to explain the shadow?

*George.* Follow the example, and then observe that the sun is here *apparently* perpendicular to the P. S.

We have nothing to do with that part of the perpendicular that falls from P. S. to E, in *this* lesson.

*Eliza.* And is not the sun in the example *really* perpendicular to the P. S., brother?

*George.* If it were, the sun would appear to be *directly over the spectator's head*, or the station of view; for the distance between that and a *visible* horizon would be too small to make *any* deviation from such conclusion when we consider the immense height of the sun; and, besides, then there could be *no* shadow to the post, whereas the length of shadow exhibited by the example, proves the sun to be but few degrees above the horizon.

*John.* Then what is the use of the perpendicular line from the sun to the P. S.?

*George.* It determines the vanishing point of the shadow of the post, *which* you see is treated as a parallel object, because it is the shadow of one ; and such shadows as diverge from the horizon, have the converging point of their parallel sides, at the *foot of the luminary*, in the horizon, when produced on *level* planes ; so the perpendicular, which is the object of your question, is let fall from the luminary in order to find the *foot* (as it is termed) from which the shadow must diverge.

*Ann.* Then I am to *suppose* the *sun's real distance*, and to consider the perpendicular line as one let fall from the direct ray between my eye and the sun ; and dropping on the P. S., in the visible horizon ?

*George.* That is right, sister, for the real sun must be as well understood to be at its real distance in this example as in that of fig. 131, B.

*Ann.* Your explanation of which enabled me to propose the right conclusion here.

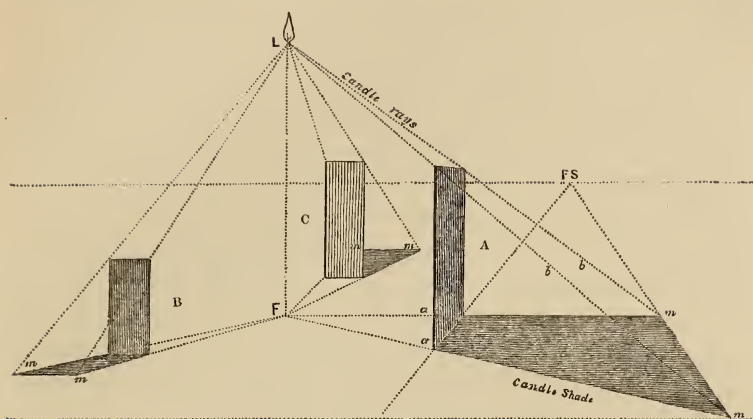
*Eliza.* Figure 131, D, has its *perspective lines* to the original point of sight, and its shadows converging to the horizon in the direction exhibited in the example. What determines the length of this shadow, brother ?

*George.* The same sun, as a point to draw from, will produce the shadow as you see it in the figure.

*John.* How is it to be done ?

*George.* First draw the three shadow rays from the post to V. P. ; then a ray from the centre of the sun, through 1 on the top of the post, down to 1 on the hithermost shadow line, will determine the length of the shadow ; and having found this point, lay your ruler to it and the P. S., and draw the short line from the first line to the second, this exhibits the shadow of the top of the post on the left side : then, from the furthest end of this short shadow line, draw a horizontal one to the farthest line of the shadow, and this gives the shadow of the opposite side of the top of the post (the numbers on the points of the post agree with the same on the shadow), which completes the outline.

*Eliza.* I suppose we are to imagine the sun to be behind us in this lesson ?



132.

*George.* Yes—and, as I explained before, at its proper distance. This, I think, completes our present remarks on sun shadows of single objects, and we will next proceed to CANDLE SHADOWS, as in A B C, fig. 132, which are represented as receiving their light from a *candle* at L. From this candle flame let fall a perpendicular to F, which is termed the *foot* of the luminary; then draw rays from the *point* L through all the uppermost angles of the three panels, continuing them far enough to *meet* the corresponding rays that are drawn from F, through all the lower angles of the panels, as at *m m*, in each example; then lines drawn from *m* to *m*, form the ends of the shadows.

*Ann.* How did you determine F (the foot of the luminary) to be exactly where you placed it?

*George.* In order to bring one edge of the shadow of A parallel with the horizon, as F *a m*, the more conveniently to compare the difference between it and the sun shadow, fig. 131, B; and F being thus settled, B and C become subject to it. Now, I believe, we may go on to fig. 133.

*Eliza.* This appears to be very intricate.

*George.* It will not be found difficult if you proceed methodically, especially if you have thoroughly understood all that has been previously explained. The *perspective* of the whole figure, which is to be completed before we give any consideration to





Then settle their proper lengths above and below the horizon by *triple* measures; first the line L W, from which draw the rays retiring to their respective V. P.s, which will produce the bottom and top lines of the wall, and height of shed L 7, and you will find the point *r* for the angular line of the house L *r* on the ground line; from *r* draw the retiring line *r v s*, and at the L, which is over *r*, draw the line L L, both toward the left hand V. P.; this gives L S its proper length.

Now find the height of the hithermost angle of the shed (all below the horizon), and mark *l*; from which draw the retiring lines *l 3* and *l A 2 Z*, then take the height, and draw the perpendiculars of the right-hand wall at R 1, draw the top R T and the bottom I Z to their proper V. P.; next draw the perpendicular *v L* its proper length.

Now raise a perpendicular line over the left V. P., and draw the front slope of the roof L *a* L *f* on till the point *c* is produced on the perpendicular V. P. *c*; then *c* will be the V. P. of the other end of the roof, and of the diagonally ascending sides of the chimney, as well as all other ascending lines *that would be parallel to the surface of the roof*; such as rows of pantiles, and the ascending sides of slates or tiles, and the visible sides of other roofs *similar* to the example.

In like manner find the V. P. of the shed, by drawing the line L 5, from the top of the hithermost corner of the shed, on, till it touches the perpendicular over the left V. P., which (as in the roof above) will be the V. P. of the other end of the roof of the shed; now draw the ridge of the house, and the lower edge of the roof, in the direction of the right-hand V. P., and the top as well as the bottom *end* of the right-hand wall in the same direction, and pencil the arch of the door according to the example, and the perspective of the whole may be inked in, except the ridge.

*John.* Ay, *that is* left that the *chimney* may be drawn first.

*George.* Yes. Now to draw a chimney, we must first describe the line *a b* from *a*, towards the right-hand V. P., and on this line, at *d* and 8, erect the two perpendicular lines of the chimney, and mark the height of the *d* line at *g*; and from *g* in the retiring direction, to the right V. P., draw the top line

of *g* 9, and to the left V. P. draw *g h*. The appearance of the chimney from the roof is depicted by drawing from *d* and 8 up the roof, in the direction of *c*, and when you have added the third apparent perpendicular of the chimney which falls from the ray *g h* and *h*, it will terminate on the ascending ray *d c* at its proper place. *Here* draw the inner line of the bottom of chimney towards the right V. P., and you can then erect the fourth perpendicular of the chimney to *i*, whose height is given by drawing the line *h i* from *h*, towards the right-hand V. P.; the short line *g i*, towards the left V. P., then completes the whole outline (independent of the shadows); which, when inked in, and all the pencil marks, except the vanish lines of the roofs, are rubbed away, will appear as the *finished example before shading*.

*Eliza.* Let me draw the *shadow lines*, brother.

*George.* But first let me give you a general explanation of them, which, if you will deliberately receive, that "*intricacy*" which appears to have impressed your mind will be unravelled.

Every marked line of the sun's rays has a capital L near the top; these rays or lines are *all parallel*, agreeably to our explanation in fig. 131, A; each L line conducts the shadow of some principal point or angle to its proper station on the plane that receives it (such as the level plane of ground which forms the whole base of the buildings, as also the sloping planes, the roofs), and the L lines determine the sun's altitude; and as the example determines his aspect to be directly on the right-hand, the shadows must consequently all fall directly to the left; by this determination, a level line, drawn from the foot of any perpendicular towards the left till it meets *its corresponding* L line, will there fix the terminal point of shadow for such perpendicular.

*Eliza.* Will you give me an explanatory instance or two, brother, before I venture to begin?

*George.* With a great deal of pleasure. Now look to triangles *V v L*, *W W L*, *t r L*, *u s L*, &c., and you will find the points of shadow produced by the meeting of the horizontal and diagonal sides of the triangles, which their proper perpen-

diculars form. The top of the sloping pole has the base of its perpendicular at Z, from which draw a horizontal line till it meets that L line which passes down to *y* from the top end of the pole, which would make *y* the terminal point of the shadow of the pole, were it not for the interception of the *shed*, which, in this instance, stops the shadow at B. But of this latter *point* we shall treat in its place, as the triangle Z *y* L to find *y* is the object of this proposition.

*Eliza.* I think I may begin to draw the shadow lines now; but you must direct me.

*George.* You see that the explanatory marks consist of *numbers* and letters, and it is very reasonable to conclude, that the authors of such drawings begin with 1, 2, 3, or *a, b, c, &c.*, or the initial of the proper name of the point, as P. S. for point of sight, &c.; and if the work is so full as to exhaust the small alphabet, recourse is generally had to capitals. Will this general information enable you to proceed?

*Eliza.* I will try: here is the horizontal line 1, 2, 3, I first draw that; then 2, 4; and next 3, 5; and then a line from 4 to 5.

*George.* Now ink in the lines you have drawn, and observe they cut off as much of the shed as the shadow of the wall would if it were high enough; but you perceive that the shadow of the top corner of the wall reaches no further up the line 4, 5, than the point 6, which is found by—

*Eliza.* Drawing the L line till it touches the line 4 5 at 6, draw T *x*, *x* 6, and T 7, according to the example, this marks the shadow on the top of the wall.

*George.* And completes the *whole outline of its shadow*; which you may render more evident by washing, according to the finished example, a tint over the space that is bounded by 1 2 4 6 7 T and R. Now proceed to draw the outline of the shadow at the *end* of the shed.

*Eliza.* This begins at *l*, and horizontally on to *m* the L line finds the point *m*; now I draw from *o* to *n* horizontally,—*n* is found by drawing the L line, which descends from the top of that perpendicular of which *o* is the bottom till it meets the horizontal line from *o* at *n*, then the line from *m* to *n* is the



shadow-line for the left-hand end of the roof of the shed. But here is a *p* and *q*; these you must explain, brother.

*George.* You will observe, that the wall (where the door-way is) prevents the shade of the shed from falling in the line of *o n* (look to it—see that it is so). And were there no opening door-way, but a plain wall, the shadow would fall on the wall by the line *L q p*, but because *there is an opening*, it is lost at *q*, and the remainder of the shadow goes on towards *n* till it unites with the shadow of the house.

*Eliza.* O, then, I am to fix the point *p* on the line *W r*, where the line *m n* crosses it. Why does the shadow fall on the line *L q*, instead of in the direction of the other *L* lines?

*George.* Because of the *sloping* position of the shed roof, and the oblique view you have of the wall which it falls on: if you look to *L T 7*, you will see that shadow is governed by its *L* line; and there would be no angle at *T* on the *L* line if the wall of the house were not oblique to the view, because the top of the wall represents a geometrical level. Now you may proceed to the shadow of the wall and door-way.

*Eliza.* I perceive that the horizontal line *W W* gives the direction of the shadow, and the *L W* line its projection, the short line at *W*, which shews the thickness of the wall, goes to the left *V. P.*, and the line *W t* to the right *V. P.* The two horizontal lines that mark the open or unshaded part through the door-way, will be drawn from the inner left side and outermost right side of the door-way towards the left hand; and the three lines of light descending from the centre *L*, and the two sides *M* and *N* of the door arch, will produce the three radical points for the shadow of the arch, which, in this very *narrow* space, will be sufficient to sketch the curve. But, brother, suppose the sun shone in a direction to shew *more of the arch*, and I would draw the *exact* form of the shadow on the ground, how should I set about it?

*George.* By making several points on the front curve of the real arch, and letting fall perpendiculars to the ground line of the door-way, and there marking points corresponding with those on the arch, that is, a point on the ground line, perpendicularly under a point on the arch; then from every point on



the ground draw *horizontal* lines to the left, and from every point on the arch draw *L lines*, and where each pair of lines would meet, would be points through which the curve of the shadow must be traced.

*Eliza.* Now the lines for the shade at the left-hand end of the house may be easily done: first, the three horizontals  $r\ t$ ,  $v\ V$ , and  $s\ u$ , and their correspondent diagonals from the three angles of the roof  $L\ t$ ,  $L\ V$ , and  $L\ u$ , uniting at  $t$ ,  $V$ , and  $u$ , form the terminal points of the shadow, and the line that retires from  $u$  towards the right-hand  $V. P.$ , marks the shadow of the furthestmost eaves of the house.

*John.* Now you must draw the shadow lines to the chimney, sister.

*Eliza.* I shall first draw the ray from  $a$  by  $e$  to the left-hand  $V. P.$ ; then the horizontal line from  $d$  to  $e$ , and from  $e$  I raise the perpendicular  $ef$ ; then the line  $df$  will be the shadow line of  $d\ g$ , therefore lines drawn parallel to  $df$  from those angles of the chimney that touch the roof, will give the proper width of the shadow of the chimney. Now having these three shadow lines of the chimney in their proper directions, the three  $L$  lines,  $g$ ,  $h$ , and  $i$ , will meet them at the proper points to determine the length and shape of the shadow of the chimney-top.

To draw the pole that leans against the corner of the wall, and its shadow, I must first draw the ground line  $F\ 1\ z$  to the bottom of the wall, and in the same direction, that is, towards the left-hand  $V. P.$ , and then mark the space from  $1$  to  $F$  for the foot of the pole: I then draw the pole (touching  $R$ ) its proper length, this completes the pole. Now I proceed to the shadow. Let fall a perpendicular from the top of the pole to  $z$ , from which draw a level line to the left, long enough to receive the  $L$  line from the top of the pole down to  $y$ , which would be the terminal point of the shadow of the pole, were it not for the interception of the shed roof, which receives the shadow at  $B$ . To find  $B$ , I must draw the line  $D$  parallel to the  $L\ 6$  ray; and from its lower point, on the shadow line  $6\ 7$ , draw a line parallel to  $5\ 6$ , till the point  $B$  is found on the ray  $L\ y$ ; now I draw so much of the shade of the pole as falls on the roof of the shed from  $B$ , through  $6$  to the edge,

which gives G; then the shadow on the ground from F toward *y* till it touches the side of the shed at A, and the shadow from A to G, finishes.

*Ann.* And will these specimens teach us how to draw the shadows of all objects?

*George.* They comprehend principles for all: and if you will practise accordingly, you will be convinced of their comprehensiveness. Should you require more examples, the authors I have mentioned abound in detail; but I have learnt, that endeavour, upon true principles, invigorates genius, whilst an example for every circumstance weakens it. Yet because life is so definite, and art without any apparent conclusion, we must make the most judicious use of those discoveries which time and genius have provided for us, avoiding the prodigal and vain conceit of inventing our own eminence. For although the KIND DISPENSER of benefits may have conferred on us faculties of the highest order, we must be as much beholden to those who have gone before us for any *permanent* height, as the upper strata of a building are to the preceding courses or foundation; and so sensible are great and liberal geniuses of this, that they gratefully and justly acknowledge the *grounds* and *basis* of whatever eminence they arrive at, to have been the LEARNING of their predecessors; and, gratified as our *Father* was, when he discovered the ULTIMATE DIAGRAM of colours (see Letter XVI.), he acknowledged that he believed he should never have brought it to its high *title* had not the *beautiful antique datum, the three equilateral triangles*, laid the foundation for him.

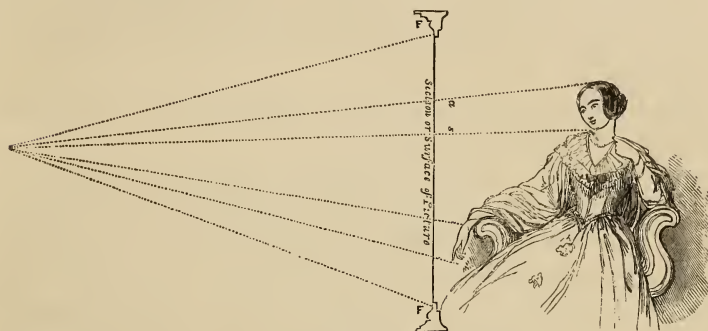
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#### CONCLUDING DIALOGUE.

*Ann.* Permit me, brother, to call your attention once more to the evident variations of the size of separate objects, according to their distances from the *eye*; which inclines me to think that a *single figure* would be affected by the rule you have given us, if one part of it were to be much nearer my eye than another; please to help me *clearly* through this idea.

*George.* Inconsiderate artists, before they have learned the

great importance and usefulness of perspective, fall into great errors for want of the thought you have given the subject, and this most frequently in portrait painting. Although many take a *real* measure of the face and features, which may answer a good purpose when a head only is to be painted, yet in half lengths, or more, where some variety of attitude should be an object of equal importance with the resemblance, the *perspective or apparent size* of each part, must supersede the absolute measurement. Attend to the position of the lady, fig. 134, sitting opposite the *eye* which is represented as view-



134.

ing her through the aperture of the frame F F, which is to contain the picture when finished. Suppose the surface to be glass instead of canvass, and that a real figure sat behind it, as the drawing represents,—the rays from the *eye* to her head must pass through the glass at *a* and *s*, which would give the proper size the head should be drawn. The same rule will determine the size the hands should be in the picture.

*Eliza.* But the *right* hand is *so near* the sectional plane or supposed glass, and the left at equal distance with the head, that there must be considerable difference in their size, when painted by the rule you have given.

*John.* And would not that make the right-hand look too large for the head and the left-hand?

*George.* This question passes as a reasonable one, with older artists than you, John. Perhaps you have not observed that the man on horseback, including both (fig. 115), are not higher than the elbow of the military figure in front; and in the chess-

board (fig. 101), the furthestmost row of squares is not one-third the width of the front row. You must look back to our conversations on the subject of fore-shortening and proper point of distance, which, with the other explanations I have given you, will make you the best answer possible: you should all observe, that *one* perfection in a picture demands the society of others. The truth of perspective *alone* would not establish the excellence of the picture—it is of so eminent a class, that all the perfections of art must unite therewith to evince its importance, and confirm their own.—What would a scientific general be without an *intelligent*, as well as a brave staff? and what either, without as brave an *army*, *all* subordinate members of one body?

*Ann.* Then we are to consider PERSPECTIVE as the *generalissimo* of painting, I presume?

*George.* Whether our comparisons be strictly parallel or not, *this I may repeat*, THAT EVERY MOTION OF THE PENCIL MUST BE LIABLE TO ERROR, unless directed by the *eye*; and the art of perspective is absolutely necessary to convey to a *flat surface* a *true* description of what is SEEN on the variegated surface of nature. *Faulty* perspective in pictures, bears an exact comparison with *faulty* grammar in language; and a *strict* grammarian may prove the insufficiency of mere grammar, by writing grammatical nonsense, as a *correct perspective* may be found in a very nonsensical picture; but the fault would not be owing to the *perspective truth*; therefore, as the ingenious and learned Du Fresnoy, in his “Verse on *Perspective*,” could never intend to excuse a painter for his ignorance of as absolute an essential throughout *every part* of a picture as correct grammar is throughout every part of language, I would seriously advise those who have advanced in the practice of painting, under the flattering and deceiving impulse of “*intuitive infallibility*,” to relinquish the delusion; and learn, from the *knowledge of perspective*, and her attendant elements, “HOW TO BEGIN, PROCEED, AND FINISH A PICTURE.”











# LETTERS

ON

## DRAWING AND PAINTING.

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### LETTER I.

EPISTOLARY INSTRUCTION PROPOSED.

*To Miss B.*

MADAM,

WHEN I proposed assisting you by literary correspondence in the Art of Drawing and Painting, with the best instruction I could possibly convey, I did not expect you would have been so very diffident, as to make your first question so general and comprehensive. Your humility in professing to know nothing, not even “what to ask,” and your desire “*to know all I can teach you,*” have involved me in an undertaking in which my success can only be comparative. The pleasure to be derived from the practice of this most rational and delightful art, must be proportionate to the refinement of that taste and judgment which is founded, or at least matured, by a knowledge of what is good. To possess so great an enjoyment, is well worthy the most earnest and arduous application, —“*a work of merit must always be a difficult work;*” but it is that sort of difficulty which is as opposite to *trouble*, as *pleasure* is to pain. The difficulty of the work in which I have volunteered my assistance, is greatly increased by your demand for “*all I can tell you,*” because it comprehends a desire to be informed of “*all that is necessary to be known on the subject:*” to qualify this, will only require due candour on both sides. What I cannot teach you from my own acquired stock, shall be given by *references*, on

which you may depend; of which, if you make the use I shall recommend, our success will be equal; and I shall derive considerable confidence from knowing that my best endeavours are addressed to one who will readily excuse my plain style of writing, while the matters treated of are found to convey the information required.

It is not my intention to make any drawings for your imitation, in the course of this undertaking, excepting explanatory diagrams, because every kind of example you can choose, or require to begin with, is to be found in great plenty at most of the print shops; and as you advance, *busts*, *figures*, and good paintings, may be very easily obtained. Thus, by a regular progress, you will acquire the power of imitation, so as to begin to study from nature, and thereby find a sure footing on the direct road to accomplishment in art.

Before I begin my manual, it may be proper to give you a general view of what a student in painting should attend to, as indispensably requisite to the conveying of his thoughts to the tablet with propriety, so as to entitle him to the credit which *a good picture* (from whatever source produced) confers on its author: and it does not occur to my mind that I can convey those ideas better than by sending you the copy of a letter which I took occasion to write to Miss S., as follows:—

MADAM,

In a friendly conversation with your father, on your taste for painting, I endeavoured to prove the necessity of your becoming acquainted with *practical geometry*, PERSPECTIVE, and the *proportions* of the principal antique statues; as also of the five orders of architecture (so far at least as to retain a perfect knowledge of their distinct and leading characters), on account of the frequent and unavoidable introduction of them in landscape and historical painting: and indeed there was not any one elementary branch of the art, that I did not strongly recommend to your attention. But he seemed not only unaware of the importance of such attainments, but considered them as so many “*clogs to genius* ;” seduced perhaps by the sarcasms of caricaturists, who through ignorance of the benefit which KNOWLEDGE



confers on genius, have endeavoured to persuade their class, that the enquiry after *method*, is not necessary to the *truly gifted* fraternity of the muses.—But that truly gifted genius, Sir Walter Scott, was judiciously and most instructively aware of the advantage of knowledge, for *by it*, he makes Fitz James subdue the hardy and courageous Roderick Dhu: who is described as possessing every requisite quality that nature and *practice* could give him, but that of the *art* of using his weapon with that accomplishment, which *knowledge* had conferred on his royal opponent.—Were you practising as an *amateur* only, the consequences would rest on yourself alone; but as you have taken up the character of an artist, by public exhibition of your works, I feel it a public duty to intrude on a few of your leisure minutes, with some remarks on the subject; as I fear your father's opinion (“that your *great* and *natural* *genius* is *superior* to the control of rules”) must tend to bias your mind, with impediments to *successful* progress.

Believe me, Madam, notwithstanding your acknowledged taste and genius, you will find it difficult to pass the ordeal of true criticism, without an *acquired* knowledge of what may be termed the mechanism of a picture. I readily admit that your *genius* may attend you so far as to *sketch* a general idea of a subject, conveying to one's mind an immediate recollection of some particular person, place, or historical circumstance; but you can go no further—*genius here wants her auxiliaries*, whose names I will repeat as an inducement to your acquaintance with them, if you ever expect to pass that barrier, which stands between the *palette* and the *canvas* or *tablet* (unless you confine yourself within the humble sphere of a very servile copyist). The chief of them are, GEOMETRY, PERSPECTIVE, ARCHITECTURE, and LANDSCAPE, for your *scenes*; and the ANTIQUE PROPORTIONS, ANATOMY (both *human* and of *other* animals), CHARACTER, COSTUME, the PASSIONS, LIGHT, SHADE, REFLECTION and COLOUR, for both *scenes* and *actors*. And, in the same degree that you acquire the knowledge of using the aid these afford, will your powers be increased, rather than “*clogged*.”

First, without practical *geometry* (which, inasmuch as it com-

prehends the production of every variety of *form*, may very fairly be termed the artist's mechanical alphabet); you are incapable of drawing or proving the truth of the parallelogram or oval, which is generally the *boundary line of a picture*; and as for PERSPECTIVE, I have the highest authority, as well as my own positive conviction, to assure you, that the grammatical rules of language are not more essential to writing and speaking correctly, than the rules of perspective are to painting: for, as the elegant language from the tongue of a scholar conveys clear and simple ideas to the mind of the uneducated, by the natural power of the ear, yet, while he hears, understands, and wonders, he cannot repeat what he has heard, for want of a rudimental acquaintance with the mechanism of the language which conveyed it; so the various objects of nature and art are conveyed to the mind, through the organ of sight, but cannot be scientifically described, without the mechanism of *perspective*, without which, you are liable to make as many errors as touches: as much so (although not always so perceivable) when the subject of study is an animal, or a group of flowers, as when it is from geometrical forms.

Next, how can you sketch any design, where *architecture* is required, unless you know its general characters at least? And if your subject should be landscape, sketch you may, but it will be impossible to finish without a thorough acquaintance with the detail of natural scenery, by study of its *characters*. Now, Madam, we come to the *actors*, or animated part of the picture, which (do not think me severe) *must* all be crippled and disproportionate, by the best aid of mere *genius*, unassisted by practical knowledge of *proportion* and *anatomy*; and without that *expression* and *character*, which can only be acquired by studying the physiognomy of the passions, nothing worth the labour can be expected. *Costume*, well attended to, strengthens the great end of historic painting, and is indispensable. These all will require the embodying powers of LIGHT, SHADE, and REFLECTION; and the art of mixing paints consonant with the arbitrary power of light, will demand a knowledge of OPTICS and the science of COLOURS, to determinate into PICTURES.

Now, to prevent delay in speaking of the merits of these pro-

posed auxiliaries, or elementary help-mates, let us suppose you to obtain a *tracing* from some masterly picture, whereby you would become possessed of a *perfect* outline: then let us set aside the *original picture*, and see what you will make of the outline thus obtained, proceeding entirely on your own skill, in the department of *light, shade, reflection, and colour*; even aided by a recollection of what you saw of *this* in the original: and from all I have ever seen of the *genuine* productions of *unelementary* amateurs, I should expect the picture when finished, notwithstanding its fine correct outline, to be, in all other respects, *one entire mass of errors!*

It may (by a superficial glance at the subject) appear to be a want of taste in me, when I assure you that an inexperienced *artist's* reliance on what is to be acquired by frequenting exhibitions of painting and sculpture, can only be reckoned on a parallel with the knowledge that is to be obtained by thus viewing other pieces of elegant workmanship, while unacquainted with the mechanical means by which such works were produced.

The art of making a good picture depends on a mechanical knowledge of the formation or (shall I say) anatomy of all the objects in such picture; and of an experimental process for the whole operation:—therefore, the first necessary knowledge of a student must be *how* to perform the work, leaving the choice of *what* is to be performed to a judicious and skilful director; should natural genius not supply that desideratum.

Any lady or gentleman of good taste and judgment might decide on the most elegant carriage in Long-acre, or the most elegant piece of furniture or apparel, by inspecting the numerous marts for such commodities—as also the most interesting and (perhaps) meritorious picture in an exhibition; but this sort of accomplishment in them would not advance them one step in the manufacturing part of the art or trade, by which such object of their choice was produced. The only advantage, therefore, to be gained by *viewing finished works*, is (according to their goodness), to improve your taste and choice, which, as far as that may be accomplished with purity, may be a very necessary part of a student's general attention, as teaching *what*

is to be done; while how *it is to be done*, depends on as great a difference of accomplishments as lie between the making a coach properly, and that of choosing, or (I may say) riding in one.

If, therefore, you are determined to learn the art of exercising your genius on picture *making*, you must submit most patiently, industriously, and *methodically*, to the *proper means*, by which alone the professional artist can hope to rise superior to the uncertainty of the opinions of mere connoisseurs.

You are pleased, no doubt, with the compliments paid to your *genius*, *taste*, and (what your fond father so mistakenly doats on) your *intuitive knowledge*, of whatever you undertake. This is worse in its effects than the severest criticisms, tending to lull you into an indifference to those *aids*, without which the works of genius can only rank with the *wild* productions of nature, without her consistency; because nature is always competent, but the utmost efforts of art are often deficient.

It will be well for you to inquire also into the natural cause, associations, and effects of *colour* called *aerial*, or that which is produced by light, on the various masses of atmospheric matter; according to the circumstances of *situation* and *quantity* of both one and the other. A studious investigator will find the *iris*, or *rainbow*, a kind of gamut (if I may be allowed the comparison), which will much advance attainment in this department. I may safely venture to recommend my own theories, accompanied by illustrative diagrams on the subject;\* the manuscripts of which you are welcome to peruse; with which, if you have perseverance to become acquainted, you will not have to regret that *waste* of *time* and *materials*, which is occasioned by the blind and conceited attempts of *mere genius*, or rather the *fantastic* invasion of its province, without *science*: but when elements are practically united by progressive application, they will form a clue of *such an extent*, that genius may proceed without danger of being lost in the disappointing mazes of ignorance and conceit. You can never stretch to the utmost limits of elementary ground, while you are content to range the ample space of *possibility*, *consistency*, and *beauty*: and your

\* Now published in Letters XVI. and XVII. of this work.



clue will never tighten till you wander into the wild regions of *absurdity*.

Were you to content yourself with *copying* only, which, in a moral point of view, is blameless; and must certainly be considered as an amiable and elegant, as well as rational occupation, when chosen as a means of innocent amusement, or honest livelihood, in humble preference to any other *trade* or calling; a correct eye, and practical command of hand in the use of the materials, would be almost all that a copyist could require; because forms, characters, lights, shades, and colours, would be all before him, demanding only attentive imitation. And I am not backward to allow, that a very correct copyist must be considered as a genius of a certain class, and, by sufficient application, may seem to ascend a *step higher* on the scale of merit. For if such an artist has a good memory, and some taste, he will draw or paint what he *believes* to be *original*; taking a *new* subject, and treating it according to what he has copied from, or observed in others:—(obtaining thus a sort of relationship with the great names of those whose works had furnished him with all the science and taste that such productions generally possess: as we find in many catalogues of sales—“*School of Rubens*,” etc. etc).—It is surely to *such* artists the proverbial conclusion is applicable, that “*those who follow must go behind*,” taking example upon trust, and rather shunning than seeking the reasons and causes of effects. Or, if by misconstruction they are alarmed at the above predicament of “*those who follow*,” they blunder on in their own uncultivated conceits, as if hastening to the summit of perfection, dreading alike precept, system, and example; and fondly hope, that by the vehemence of an effort, the palm of originality and of fame must certainly be secured. Too many *young masters* are content with this degree of originality; but it can only obtain that sort of rank as artists that musical geniuses acquire by ear; who, for want of scientific knowledge, must ever remain ignorant of the art for which nature particularly qualified them.

You will plainly perceive the course I think you should adopt, that of studying to qualify your mind with clear and decisive *reasons* for your proceedings; observing always, that



although bad examples may be blamed as the cause of your errors, they are never to be admitted as *valid* excuses: and you will make but slow advances in what is requisite to be known by those who are ambitious of *improving* the fine arts, while you sit down contented with an example set before you (however highly esteemed), without investigating the primitive causes, which must have directed the mind and hand of its author. For rarely, very rarely indeed, has it happened, that genius has been so great as to arrive at eminence, without scientific aid; or become able to perform a work, according with rules, without an acquired *knowledge of them*.

Sir Joshua Reynolds has said, that rules are not the fetters of genius, but "*fetters* only to those who have *no genius*:" admitting, therefore, that there have been such geniuses as first "bisected the angle," found "the centre and two diameters of an ellipsis," and "discovered the trammel," etc. etc.; yet it is still uncertain whether these, and such like steps in science, were the gifts of accident to *intuitive genius*, or the regular fruits of scientific application. Be this as it may, we are now, by various means, in possession of such perfect rules for most of the mechanical parts of the fine arts, that instead of a *genius*, he must be a *blockhead*, who will not try to avail himself of them. I hope you will, therefore, agree with the conclusion which must follow, that scientific rules are the only sure and easy, though deliberate conductors of true genius to the TEMPLE OF FAME.

## LETTER II.

### MATERIALS AND POSITION.

MADAM,

IT gives me great satisfaction to find that you are resolved to follow the strictest discipline of rudimental inquiry, as by such means alone can your genius receive a fair trial. Let *perseverance* be your motto, and you shall have *success* for your crest.

Having required the whole of the system, you will of course

permit me to tell you some things that you already know,— That you will only have occasion for a good black-lead pencil, a *sharp* pen-knife, and some drawing-paper, or a drawing-paper book, to begin with; and your first attention must be, to the proper manner of holding your pencil, which, when you have cut to a good point, you will handle precisely as you would a pen, except a constant regard to holding it at a much greater distance from the point, which will soon become habitual. Take care never to hold it too tight, but handle it with ease and freedom, using little more of muscular exertion than is sufficient to keep it from falling from between your fingers. It is of considerable importance to observe personal ease and freedom; making an easy, graceful *position* while engaged in study, an object of the *greatest importance*; for many have neglected *this*, to the injury of their health as well as of the natural beauty of their persons.

You will find it proper to set whatever you undertake to copy, nearly upright, and directly before you: a good reason for which you will find fully explained in my “*Dialogues on Perspective* :” where you will be convinced of the absurdity of having either your own drawing, or a copy, in such a direction, as to look *obliquely* on their surfaces (see the dialogue on “foreshortening”). You must therefore have a desk, or easel (see fig. 140), which you may elevate, or lower to a proper direction, by placing it before you on a table, and raising the desk-lid, till your eye is as near the top edge as the bottom: that is, suppose a perpendicular wire were to be set up in the centre of the lid, then raise the lid till the wire thus fixed would point to your eye, as you sit in the easy position recommended. Or, you will find it very convenient to take a light portfolio, or plain board made for the purpose, on your lap (see fig. 140), and rest it against the table where your copy is properly set up, till by inclining your head easily forward, *without stooping*, you find your *eye* fall nearly perpendicular to its surface. Thus, madam, you may be properly prepared to begin drawing; and the best observations in my power shall be the subject of my next letter: in the mean time please to provide yourself with the materials required, and some Indian rubber; and, as it will be proper

that you give early attention to the "Perspective Dialogues," you will there find what other instruments are wanting.\*

### LETTER III.

#### RUDIMENTAL INFORMATION.

MADAM,

THE first efforts of your pencil must be, to draw perpendicular *straight* lines parallel and equidistant one from the other, beginning with lines about one inch long, and (strictly observing the *ease* before advised) practise till you find you can draw a row correctly, and as fast as you could very deliberately count double the number, as, 1, 2, 3, 4, while *drawing* two lines; then increase the length of the pencil-point from your fingers' end, and make the like experiment on lines two inches long; and practise till you can easily draw *perpendicular* lines, equal distances asunder, three inches in length; then repeat the above process with level, or *horizontal* lines. After this you must proceed to *oblique* lines, inclining both to the right and left; and to complete this command of the pencil, you must draw curved lines, according with the above system, till you can draw a good circle. These are the *radical lines*. This seemingly tedious and unentertaining beginning will be amply rewarded in the very next stage of your study.

First exercises are generally done in *copy-books*; and the only disadvantage arising from using such, is, that a very important part of the commencement is too often neglected, that of a proper manner of holding the pencil, and placing the paper to be drawn on; as also your own position, which should continue your *chief* care, till habit has made it natural to you. Then you may draw on the copybook, if you please, while you recollect that you are not *writing* in it.

I much recommend the habit of *standing*, both to draw and paint, as most conducive to health: the arrangement necessary to such, requires no further direction than to observe the rule I have given; viz. placing everything at a suitable height;—

\* See sizes of drawing-paper at the end of the last Letter.

which, if you have not ingenuity enough to contrive, and that in a completely convenient manner, you may assure yourself that you have not *yet* equalled Archimedes as a contriver. Indeed, it is all contrived to your hands in a frame called an "easel," to be had at any of the colour-shops (see fig. 140). But the contrivance I alluded to was, that the *desk* might be very conveniently raised to a proper height by a box, or the like, when you have no easel. There cannot be a greater proof of unfitness for the fine arts, than aspiring to the end, without due attention to the means; I therefore seriously advise you never to begin till you are *well provided, and prepared with SUITABLE MATERIALS IN ALL RESPECTS*. Here observe, that a dull-edged knife will waste both time and pencil, and is a certain proof of great laziness, or some equally improper disposition for the pursuit of excellence. If you pay due attention to preliminaries, you will study with much greater chance of improvement, than by any irregular mode; and by practice you will almost forget that any system has been required. The proper manual of the art will become natural to you; and you will feel the benefit of that *liberty*, which some shallow thinkers imagine should be granted from the first: but, perhaps, I can convince you of *their mistake* by the following observation:—

Suppose two natural geniuses of equal capacities were to commence the study of *instrumental music* at the same time; one having the best theoretic explanation of the science that could be written, and I would also grant *full* and clear methods for the application of the music to the instrument,—but *no master*. To the other *genius*, I would allow and recommend, *all the above*, under the government and tuition of a judicious *performer*, who should strictly enforce and explain all the nice punctilios of time, air, chords, tones, half-tones, etc., etc. Can it be a question which would become the *best performer*?

It may not be irrelevant to the subject, if I assure you, that the dexterous art of "*rolling on a drum*" cannot be acquired without some weeks' hard exercise; and easily as it appears to be performed, it is only attainable by one certain method. It is the same with dancing, be the taste for that accomplishment ever so great. And, indeed, *rudimental tuition* is submitted to



by almost all, more readily and patiently than by the “self-accomplished” *natural* genius in drawing and painting.

Impatience for fame among their friends, with *amateur copyists*, brings about many productions, which, when handsomely framed, become handsome furniture (independent of the peculiar value they hold in the minds of those who have been honoured with the possession), as pledges of gratitude, love, or friendship.

Thus elevated, complaisance becomes almost a sacred obligation, and that sort of criticism which might be given with the utmost advantage to the ingenious *labourer* of such pieces must never be advanced.

Mortification, mixed with a degree of astonishment, affects the mind of an artist, on seeing an *excellent* copy produced by a person who knows nothing of rudimental principles. But the absolute merit of such works is on a parallel with that which might be fairly allowed to a copy of an *Italian poem*, or work in any language, by one who did not understand the original.

How painful must it be to the feelings of an artist, to be under the necessity of restraining his real judgment from the vanity and blindness of amateurs of this description; who boast of the only or *chief* cause of the absurdity of their productions, as a *great merit!* The first remark one generally hears, is, “I never learnt”—“I have taken it entirely of myself;” then follows, “What do you think of the work?” which, after all, was perhaps *traced off at the window*. Here some sort of compliment becomes indispensable; for the man who would give an opinion according to *his judgment* will be metamorphosed into a *bear*, and probably be treated as such, where vain ambition is indulged.

## LETTER IV.

### COMMAND OF HAND EXPLAINED.

I HOPE, Madam, my last letter convinced you of the necessity of obtaining a *command of hand* by the most simple essays; for while you were engaged in attention to your position, and that



of your *pencil*, *paper*, and example, any endeavour to amuse your fancy, by even the slightest association of lines, which could divert the mind from this first object, would have been premature.

I now wish to impress on your mind what I mean by *command of hand*.

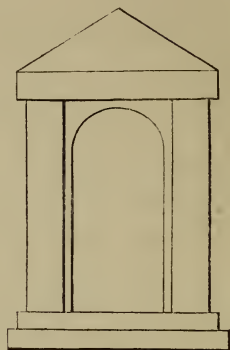
When you can easily mark the form you previously intended, not by putting your pencil to the paper, and letting it fly promiscuously, almost where it might happen, but with a governed, steady, easy hand, obedient in every part of the whole line to your well-convinced mind as to what is requisite,—so that you may take off your pencil precisely where you intended, and slope, or curve, to the right or left, whenever the subject dictates;—similarly to that sort of command of hand which enables you to write any word you choose, you have attained this *command of hand*. You will recollect the labour of your first essays, in forming the writing alphabet, and consider the ease with which you now express your thoughts in good writing; so you may depend on *equal* success in drawing by *equal* attention; and it would be unreasonable to expect that good drawing might be acquired by *less* study and application than good writing; for which there are few children allowed to be wanting a capacity.

Do not make a *compound* line by one motion of the pencil until you have a thorough command of it. Suppose two lines forming a figure like the letter A or V; draw one side, then take your pencil off, and draw the other.

Take great care that all lines which are *perpendicular*, or level, in the original, are *strictly so* in your copy, as otherwise your representations of buildings will appear in danger of falling down: this must be studiously observed, and no exception can be admitted.

I have proved it to be a very good gradation of practice for young beginners to make *simple compositions* with the *radical lines*, as the first advance towards the great object; at the same time continuing the exercise of the pencil more than that of the mind. To *such*, in particular, it will be a pleasing and very easy undertaking to draw two or three horizontal lines,

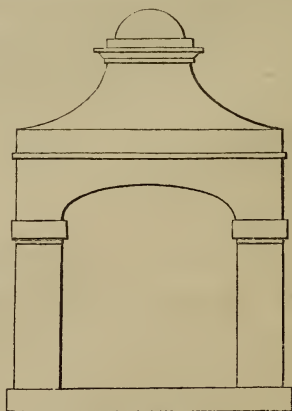
one above another (see fig. 141), as so many steps to an intended door-way, diminishing in length as they ascend; then, *near* the end of the top line, or step, to draw perpendiculars, about the proportionate length of a column; and for the inner sides of the columns, to draw two more lines, which must be all of one height; at the top of these to draw two level lines near together, the whole length of the top step, and a little projecting over the outside perpendicular lines. These will represent steps, columns, and the lintel. Then place the point of



141.

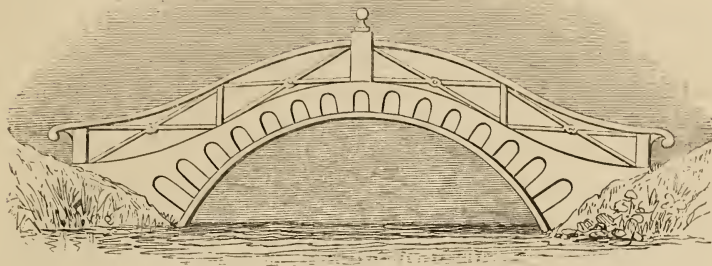
your pencil a little above the top line, in the centre, and draw oblique lines, from this point, down to the ends of the top parallel of the level parts of the pediment (the lintel); and you will have the figure of a frontispiece to an entrance. Now, if you choose to have an arched door-way within it, as in the example, draw a half-circle, the top a little distance from the lower line of the pediment, and the two lower points, the same distance from the columns, and continue the lines down to the top step.

Figure 142 is to be drawn according to the manner of the foregoing, only it will be proper to sketch a central perpendicular line (lightly) as a guide to the uniformity of the curves, and equality of the sides: this must all be done by the *eye*, as measurements, in *this* stage of the study, would impede the improvement intended.



142.

To produce the bridge (fig. 143), first draw the water-line *straight and level* (lightly); then a central perpendicular line, as



143.

a guide to equality; then touch on the water-line for the span or width of the arch, and on the central perpendicular for its height, and draw the curve of the arch;—then sketch the lines of the two banks, and draw the second curve of the arch (the top line of the bridge which rises from each bank, must be set off with care and taste, and drawn firm and free, and so uniform as to appear to have been geometrically produced): you must then finish the centre post, and draw the hand-rail parallel to the top curve of the bridge—the arcade must be as equally divided as is possible to be done without compasses, and the sides all to point to the same centre that would have struck the arch of the bridge. This is all to be done without geometrical aid, in order to exercise the eye and hand in the accomplishment of uniformity and composition.

You may thus easily invent, or copy, many lessons, proper for the accomplishment of handling the pencil freely, such as *outlines* of alcoves, bridges, temples, or any *uniform* figures which may tend to produce a correct eye, and good taste, while the *hand* is forming; taking care not to enter too deeply on very full subjects, till your pencil will readily obey your ideas, as well in drawing oblique or curved lines, as perpendiculars and levels: for (speaking figuratively) you must agree that genius should first learn to *walk* before it takes wing.

The *curve* is that which will occur throughout the whole of animal drawing; indeed, it is considered the radical source of

beauty in general, according to "Hogarth's Analysis of the Line of Beauty," a work you should read with that attention which its importance demands.

I would advise you now to procure (either by hire or purchase) a few of the best rudimental specimens of such subjects as you find the particular objects of your choice. Guided by the judgment of a good connoisseur in this matter, your own choice may, in a due degree, be consulted, taking care not to suffer your enthusiasm, or want of judgment, to overstep your tender experience; and taking care to obtain *proof* that the examples which your teacher lays before you, are as good as they should be. If his own original designs are not so, prefer good prints;—lithography has produced such in great profusion and perfection. A little practice, every day, will give your powers increasing strength; and the finest subject you can desire, may be either purchased or hired, to put your talents afterwards to the test.

Perform whatever you undertake with *deliberate care* and PERSEVERANCE; and when you have chosen a piece to copy, do not, on any slight excuse, leave it for a new subject until completed. This may lead to a proper caution not to undertake any great work at the first; a simple cottage, or plain building, with the little accompaniments natural to them, will be sufficient. "*Kenyon on Trees*," 4to., is a costly book to purchase; but if you can make it your own, you will be the gainer. Nicholson and Harding's landscapes (their own originals), in *lithography*, are excellent. Trees will require study in the detail, so that you may learn the various *touches* and *forms* peculiar to their characteristic distinctions; but rely on it, nothing but practice, and its consequence, *experience*, can render these matters easy to you.

Those whose taste inclines to the study of the human figure and animals, should be aware that these must always be represented on *some suitable ground*; so that it is absolutely requisite first to learn to draw *landscape* and *architecture* (*exterior and interior*), by the strict laws of perspective, as the only means of making their work complete; unless the too frequent subterfuge of clouds, smoke, broken ground, rocks, bushes, and other

such indeterminate matters, be resorted to, as a set-off or relieve, to the figures: even then, a statue, or bust, must have a *pedestal*, which pedestal must stand on *something*, which ought to be properly represented.

## LETTER V.

## DIRECTIONS FOR COPYING.

MADAM,

IT is a most grateful reward of my endeavours to find that you so fully approve my methods and remarks; and I shall detain you no longer in the confined walk of an entire novice, but immediately proceed to that stage of the art, where my observations may be more particularly serviceable.

Let us suppose you seated before a clear intelligible subject, a print, or drawing (landscape perhaps), *completely provided with necessary articles*, according to the instruction already given. You must first make the boundary line of your drawing (see fig. 1), and then take a general and deliberate observation, to determine the relative situations of the *principal objects* of the piece you are about to copy; such as the height of the horizon; the nearest angle of the most conspicuous building; the whole width of a building; its height; the height of the largest trees; and their relative distance and inclination from the first or principal object; as also from the margin of the drawing.

Take care to begin all objects the right distance from the base line, which is the bottom line of the picture; regarding, first, the relative *situations* of all the conspicuous parts of your subject: those parts touched lightly, will be sufficient to direct your eye to the situations of other subordinate parts of your drawing, until the whole becomes *lightly*, but correctly, hinted at.

You will find it good to determine the situation of those leading points, by observing whether they are at half, one-third, or one-fourth part, more or less, of the whole length or breadth of the picture, or between any two principal points: for example, examine what portion of the picture the land



takes, from the base line to the horizon, and you may very probably find it about one-third the whole height. Remark any variation from this, with care—the point may be settled to a geometrical certainty almost; and, in the same deliberate way, find all the other remarkable objects. If you pay due attention to the above, you may make your copy of a different size to that of the original, provided you preserve the same proportion; to obtain which, see the diagram at the end of my remarks on practical geometry. The light touches, you will make to obtain the leading points of your drawing, will not require very nice attention to forms, although the more correct the better, as they are only so many points through which your pencil will pass when you proceed to the minute outline, in doing which you must have constant regard to the proportion of one part to another; observing always what part is perpendicular, parallel, or on a level with some other part, which, it is presumed, you will have already noticed by a studied touching of the chief points.

Should the finished example from which you study be a representation of architectural *ruins*, it will be proper to touch in tender outline, as perfectly as you can imagine it would have been in an *unruinous* state, all the arches, piers, and other leading objects, as also the architraves, cornices, and other ornamental parts; regarding very attentively, and sketching as you find, all such principal parts as have, through time or accident, deviated from their original levels, circles, perpendiculars, and straight lines. Every part thus correctly settled, as to place, proportion, and form—will have provided you with means to add the marks of dilapidation in the easiest manner possible.

Old rustic cottages, and rude broken fences, whether paling, or unwrought stones, etc., may not admit of this retrospective sort of exactness with regard to the true levels, circles, or perpendiculars, which govern the architectural edifices above alluded to; because the clownish and unstudied effect of rural architecture, is that which confers *its* sort of beauty. In such cases, you must be directed by your example, proceeding much as you ought to do in drawing a map; which is, to

secure the greater boundaries correctly, and descend to such subdivisions or prominent marks as next enforce attention; gradually, and in the same order, filling in every part like the example, both as to effect, texture, and true character, as well as to the exact *force* of markings, lights, and shadows.

\* Precision can never be carried to too great an extreme, in the execution of any SUBJECT worthy the pencil. Technical propriety will always merit so much of your attention, as to secure you from the critical censure of the mechanic: “suffer not the cobbler to find fault with the shoe.” Many objects in landscape are of fixed dimensions, and should never be given contrary to their proportion; for instance: a brick, and its stratum of mortar, always measures three inches; this must make four courses in the height of one foot, or twenty-eight to the height of a seven-feet door frame. Pan-tiles cover about seven inches in width; therefore, in a roof sixteen feet long, twenty-seven rows of tiles, at least, will be requisite. Steps are generally between the height of five and eight inches each; then three eight-inch steps would rise to the height of eight courses of bricks.—Sheds and out-houses are covered with boards (called weather boards), which are seldom above ten inches wide, from the edge of one board to the next, and more frequently six or seven inches; which should have due attention, when finishing, from memory, sketches which might have been hastily outlined from nature, or when composing from fancy. But most inexcusable of all are the absurd substitutes for portions of what should be Grecian or Roman architecture, if any architectural parts are appropriate to the composition. It would be tiresome to give any further explanation of particular measurements of this familiar kind; and had I not very frequently seen instances of the ill effect arising from a total disregard to truth, where the artist evidently proved, by very nice workmanship, that a proper representation of the above-mentioned “*trifles*” was intended, I should think it proper to apologize for supposing it necessary to

\* Although the whole of this paragraph applies to original designing, yet copyists, such as the first ten letters are addressed to, will find the remarks to be of great advantage in their first essays from incorrect prints or drawings.

engage your attention to them at all: because a good *general* effect is the necessary aim of such an endeavour after the great style of art, (which *I* consider to be, a good association of objects, adapted to the subject of the picture, and represented as nearly as possible as they would really and naturally appear, under the influence of a well chosen light\*); yet the minute proportions here insisted on are to be rendered properly subordinate by *art* and *attention*; not by sketching and careless imitation.

The subordination of those parts and objects, which form the secondary and retiring space of the picture, must be suited to their station by the *finest* considerations in the art; by a scientific appeal to the governing principles (mechanically considered) of LIGHT and VISION; and not by a neglectful or affected degradation of the object, or any careless miscalculation of its proportions and properties. Study WILKIE for this; he is excellent in this one of his *many* excellencies. (I might have quoted more ancient names of high estimation, but am proud to find many others of my own time and country, worthy of the compliment.)

You must accustom yourself to touch lightly and tenderly, that you may, the more conveniently, correct and improve your drawing as you proceed.

As soon as you have marked all the general outline, rub the drawing over lightly with some crumb of bread (not damp or too new), leaving the whole barely visible. Having thus by previous application, determined everything to be properly situated, your whole attention must now be given to correcting and completing the *form* of each part, touching with due spirit on shades near the foreground of your drawing, and receding towards the horizon, with a tender hand and *perspective* eye, strictly observing your example.

Begin this stage of your work by drawing the *principal* object *first*, as at the commencement; observing here the ease with which you may descend to the detail, after having thus secured all the principal points.

\* Letter XIII. will enlarge your knowledge of *my* meaning in due course.

There will be nothing too wide or too narrow, too high or low, too much curved or inclined either way: all proportions and positions will agree with the original; and now the more attention you pay to every part, the more certain will be the effect of the whole.

By the outline, you are to understand every mark requisite to determine the form, not only of the extreme edge, or outside line of the whole figure, but of *all discernible marks* which have any share in constituting the expression and character of the piece; of which I shall have occasion to say more in its place.

There are two extremes which should be avoided in finishing an *outline*; the one is the production of a *uniform line* like thread or wire,—the other is a style too much like penmanship, dashing all the parts which incline to shade with a bold dark touch: this looks tasty enough in a mere outline, but it is not the right style of preparation for a subject that is to be finished with full attention to the light, shade, and reflection of the model.

This may have no other disadvantage, when in pencil, or charcoal, than that of producing a *manner*, because all may be softened down by rubbing with crumb of bread. But the most convenient method of preparing the general outline is, to sketch the figure fully broad enough where it is to be opposed to shade, and rather within its final size on those parts that are to be opposed by light: this gives opportunity to finish clearly, without discovering any of the first sketching, as the improving the dark parts will, in both instances, leave the figure perfect.

When *copying*, you cannot have an outline too correct, as the expedition which is requisite in sketching from life is not here necessary. It is a very bad practice for young students to sketch a *copy* hastily, and proceed to shading and tinting, hoping to make a great show of their progress in a little time. *Disproportion*, *blunders*, and *oversights*, will torment, and tend to disgust those who proceed in such a manner. Yet there are some fertile fancies which (although unacquainted with the means of producing a correct design) should not be too much confined, when a happy *original thought* presents itself; as the spirit of composition might evaporate under the care and en-



deavour, which is unaccompanied with any other knowledge, than that it ought to be correct. Such a mind will improve in this essential in good time, and has *my* humble opinion in favour of early compositions; and of your sketching your *own ideas* as freely and as rapidly as your imagination may dictate, as *memorandums* for FUTURE STUDY; recollecting that this licence given to your genius in invention and composition, is only allowed as a stimulative to the exercise of deliberate judgment and mechanical accuracy: without which your *thoughts* must remain in their original state, as they can never become *works*, until you are possessed of, and use, the means to make them such.

It will be granted that there is no material object without its *particular form*; this form being a substance, must consequently have its *lights* and *shades*; and furthermore must appear under some local colour peculiar to each part, besides that which may compound with it by reflection from the tint of the sky, the colour of a room, or the influence of some neighbouring object, or perhaps these altogether. As this must be generally admitted, it of course follows, that whatever you choose to study the imitation of, should be considered as demanding your utmost attention *in systematic order*; first, of form, or outline, which will comprehend a considerable degree of the expression and character; secondly, of light, shade, and reflection, which will produce substantial appearances; and thirdly, of colour; that the whole may be accomplished according to the appearance of nature.

Now, as all works of art must, of necessity, be progressive, a good system of beginning, proceeding, and finishing will be desirable, and is absolutely requisite.

First, as everything has a certain form, *that* must be the earliest object of attention (according to the methods just before mentioned), which, when obtained, releases you, in a great degree, from a very considerable share of attention, with liberty to advance all your thoughts to the *second* part of the subject; which is the modelling or relievo, by means of light and shade; completing thus *form* and *projection*, or substantial appearances, then follows *colour*, of which I shall fully treat in the XVIth



letter, as we have not yet had occasion to explain more on that head.

What lights and shades can correct bad drawing? or what is the use of colour to either? *None*. First *draw* correctly; then study light, shade, and reflection; which, when you have accomplished, *colours* remain a vast test of genius for your future investigation.

But, perhaps, you will be pleased to know, that when you have acquired proficiency in the *first two* parts of your progress, and can proceed to finishing (in *oil-colours*), you will *then* draw and shade with your colour, in a certain proper degree; performing the whole, except the *first sketch*, by and under the comprehensive term "*painting*," in its *manual* acceptance.

Before I close this part of our subject, it will be proper to advise you to study a *second* copy of what you have in hand, especially figures, *entirely from memory*: never look at the original for *this*, but trust to your recollection, and try the strength of your critical powers; and you will find the *utmost advantage* from such practice by the improvement of every faculty requisite to an artist, and obtain the most genuine proof that he is a *sincere amateur*.

## LETTER VI.

### THE HUMAN FIGURE.

MADAM,

I TRUST the substance of the foregoing Letters will conduct you through an outline of *any* plain *Subject*; and when practice has given you sufficient confidence, you will attend to the following observations on *copying* the forms of *animated figures*, which are as essential to a picture, as *actors* to a *stage*: and, indeed, after the rudimental progress already pointed out, are the primary object of study, and the *best*, as well as the *shortest*, road to *eminence* in the art.

It is the beauty and superiority of the *human figure* over all other animal forms, which constitutes it the chief object of a painter's study. This is because of the *variety of forms*, *atti-*

*tudes* and *expressions*, accompanied by an equal variety of light, shade, reflection, and colour, which are continually changing, according to the infinity of incidents to which all are liable; so that *few*, *very few* indeed, have arrived at so great a degree of eminence, in the imitative art, as to do justice to the noble character under which man should, according to his high rank amongst created beings, be described.

We are humbly to recollect, that it is his mental character which determines him to be “the NOBLEST WORK OF GOD;” from which it consequently follows, that to imitate the *mere animal man*, as we too generally find him, is not the greatest end of the art: under whatever character we may find occasion to make the *human figure* the object of our study, the *primitive* superiority of our subject, over all others, must be constantly kept in view. We have the highest written authority for our conclusions on this point—“LET US MAKE MAN IN OUR OWN IMAGE;” which must undoubtedly apply to the mental resemblance, when we consider the confined form of the *creature*, and the boundless extent of the *mind*.

It is a subject demanding serious reflection, to observe the wonderful perfection of the ancient Greeks, who, in their dignity of thought and purity of design, were unassisted by the DIVINELY REVEALED *history* of man’s origin; yet they seem to have been inspired by the most exalted ideas possible for human intellect to have formed.

By what association of means they arrived at this *summit of perfection*, is a secret, divulged, with but a very sparing hand, to any who have succeeded them; yet some few glimmering, but very distant lights, united with the most rational conclusions of inquiring writers, have given us sufficient assistance, by their laborious investigations, to proceed, as circumstances may chance to bring forth any additional evidence of antique sublimity. And enough of the works of antiquity have been protected from the power of *all-devouring* time, to shew us, that the perfection of art must depend on the imitation of the *most perfect* forms in *nature*, in all her various species and characters; insomuch, that in addition to the *truth* and beauty of animated forms, the appropriate expression so wonderfully

associates, that a lively imagination would almost conclude "*a Grecian statue has a soul.*" And it is no less worthy of observation, that throughout the whole of their works (at least those on which the *eminence* of the ancients is founded), they have uniformly adhered to what is particularly understood by the word "*beauty*;" so that, notwithstanding the agony, and consequent contortions, so exquisitely expressed in those wonderful specimens of the perfection of art, the group of Laocoon, and his sons, the representation of the melancholy fate of the Niobe family, and the terrible energy of the *Gladiator repellens*; their personal superiority over ordinary beings, is, perhaps, heightened by the successful appropriation of expression.

The decline of the *pure* and *great* style, may have originated in descending too minutely to detail when working after imperfect models, and substituting distortion and deformity, as the representatives of the inferior characters in compositions, as a corrupt means, perhaps, of producing a contrast, to the advantage of the hero of a group.

Although it may be frequently, if not generally, requisite, in obedience to the truth of a subject, to describe the effects of passions, depravities, and other accidental circumstances, with physiognomic punctuality; yet due attention to what our great predecessors have been able so happily to accomplish, without treating absurdity absurdly, should influence all your endeavours. There can be no means of success so certain as the acquiring a thorough knowledge of whatever you undertake, that you may be enabled thereby to distinguish between perfect and imperfect conclusions; taking care, in the pursuit of your present subject, to give to virtue and beauty the best attributes; and never endeavour to render vice or deformity agreeable, by the misapplication of your knowledge or abilities.

It is impossible for you to conceive too exalted an idea of this main object of a painter's study: for, without a competent and just conception of its importance, nothing *great* can be expected. And it shall be my utmost study to give and recommend such methods of beginning, in the mechanical

department of this subject, as will enable you to proceed with due advantage.

Beauty, grace, expression, and character, are in the province of genius, "or right-mindedness," and depend much thereon. For this you must apply to *all* the means required; taking every opportunity of cultivating and improving your *taste* and *judgment*, that nothing may be wanting which proper application can accomplish. But the bare knowledge that a Goliath has to be vanquished will not make a David. We have not to doubt that every individual of Saul's army desired the honour of so distinguished a victory; but declined the attempt through conviction of the want of power; wherein they gave a lesson of *prudence* (at least) to the vain, lazy, and ambitious of after-times:—the mere *stone* and *sling* are alone sufficient in  
AN APPOINTED HAND.

## LETTER VII.

### PROPORTIONS OF THE HUMAN FIGURE.

MADAM,

THIS is that stage of the student's progress which is the greatest test of his patience and perseverance. A very considerable majority of those who employ a *proper* drawing-master, entertain a mistaken notion of his powers, and expect to advance in fame among their friends according to the *sum* they pay him; *instead* of by the *attention* so requisite to success, which they should *unremittingly* pay to his directions and their studies.\* If you heartily determine to proceed properly, you must relinquish the most distant desire of praise, except the fair compliment to *progressive* improvement; and, in the same degree that you have patience to lay a good foundation of *practical* and scientific knowledge of the art, will your ultimate accomplishment be ensured.

\* Drawing masters are neither entitled to the merits nor demerits of their Pupils, till they have given their instructions at least a year.



Your certain test will be your sketch-book. Try from time to time what you *can do*—(after nature, or your *own ideas* of whatever subject engages your mind)—you will thereby perceive wherein you are deficient in rudimental knowledge.

Do not expect that habit will teach the pencil to move the right way, without you direct it by right ideas; *all success* depends on the means. “The painter, who, by accident, produced the foam at a horse’s mouth by throwing his brush on the picture in despair,” could not claim the merit of the effect produced: accident too seldom succeeds to place reliance on it: and, as I have before had occasion to observe, the *means only* are security for the end.

The following *general* proportions are given only to guide you in your first sketch; and a thorough recollection of them will be of great advantage in your first thoughts of composition; but you cannot proceed to the more minute articulations, and nice divisions of the figure, without you acquire a familiar acquaintance with the “*antique proportions*,” so as to have all the principal measurements perfectly settled in your memory by practice, without which, the correctness of your eye, aided by ever so competent a knowledge of anatomy, will still leave you liable to the unpardonable error of disproportion; and as such measurements and proportions bring the human figure under what may be termed geometrical consideration, a proper application of the rules of *perspective* when drawing them must be observed.

Perhaps impatient *genius* may sigh at fifteen years old, and at twenty, laugh, on hearing of so much rudimental hindrance; and wherever this may occur, vanity and superficial success may support them for a season; but *groans* of disappointed ambition, accompanied by all its train of mortifying consequences, will, when perhaps too late, awaken such from their dream of fame.

A book of antique proportions will be valuable, and you will do well to get “Le Brun’s Passions.” A general view of Anatomy is essential, I particularly recommend Albinus’s large work; a small edition from it by “Bresbam” is very



good, as is the pocket volume by Tinney. "Bell's Comparative Anatomy of the Bones and Muscles," and "Moses Retszch's Outlines," are books also worthy your attention.

Genius may be advantageously relieved at intervals, from the mechanical construction of figures, by the graceful *outlines* of Flaxman, etc., that truth and beauty may keep hand in hand, while improving your taste by *good* specimens of heads (see page 159), hands, and feet; which should be well understood before you make the *whole* figure a regular study. Yet I think it proper to have a sketch-book always at hand, and to accustom yourself to sketch your own best ideas of historical and other subjects. Raphael, Le Brun, and Lavater, for *character*, may be of great assistance in these juvenile exercises; a proportionate study of scenery, and *living* subjects, if only by sketches from nature, should share your early attention, strictly applying all the science you have acquired.

#### PROPORTIONS OF THE HUMAN FIGURE.

The whole height of the figure is, for tall figures, eight heads.

Figures more robust are divided by seven heads and a half in height, which is equal to ten faces.

It will be worth your recollection to know, that if the figure of eight heads be six feet high, the figure of ten faces will measure five feet seven inches and a half in height. Perhaps all the various characters you need design for proportion and *anatomical* information, may be found between these two extremes: genius and good judgment will, however, have discretionary liberty on this point.

The inside line of the legs and thighs of a figure to the beginning of the body, measures half its height: in tall figures this is sometimes above one-half, and in shorter not one-half the figure—four heads, or five faces.

The quarter parts of the height are from the top of the head to the arm-pits—two heads, or two faces and a half.



From the arm-pits to the bottom of the body, or middle of the figure—two heads, or two faces and a half.

From the lower part of the body to the joint of the knee—two heads, or two faces and a half.

From the knee to the sole of the foot—two heads, or two faces and a half.

The length of the foot is about one-sixth of the figure. To the figure of eight heads' height, it is one-twelfth part of a head more than one head and a quarter. To the figure of ten faces, it is exactly one head and a quarter.

When both arms are extended, the measure from the ends of the middle fingers is equal to the height of the figure—as eight heads or ten faces.

The breadth of a man at the shoulders, when his arms are placed close to his sides, as viewed in front, is one-fourth his height—two heads, or two faces and a half.

From the top of the shoulders to the elbow—one head and a half, or two faces.

From the elbow to the wrist is one head and a quarter.

The hand is in length equal to the length of a face, or three-quarters of a head.

The breadth of the hand is equal to half its length, and is also half the width of the head.

The thumb is in its length a quarter of a head, or the length of a nose.

When the arm hangs straight by the side, the joint of the wrist is at half the height of the figure, or on a line with it.

The diagonal, or longest measure of a head in profile, is about a head and a quarter from the lowermost extremity of the chin to the uppermost part of the back of the head; or nearly the length of the *foot*, and also of the lower arm-bones from elbow to wrist.

When the arms and legs of a figure are extended so as to represent the four points of a square, the navel will be the centre.

I shall not here give any general measure for the breadth or thickness of the limbs, because they vary much in these respects according to character. You will find them in a

manner you may rely on as a standard, from the book I have recommended on “antique proportions.” I have here given you sufficient to enable you to practise *composition*, which is one of the best stimulatives to further inquiry and improvement.

We can now proceed to the proportionate divisions of the head and features, which you must learn to recollect perfectly before you can expect to draw the whole figure, even in a sketch. And you will presently observe that this cannot be accomplished without separate and due attention to each part of the face; for it would be folly to attempt to draw a whole head, until you are perfect in the general rudimental forms of each feature.

The drawing of the front of the human head is mechanically begun, by sketching an outline nearly resembling the shape of an egg, or somewhat of an elliptical form, in the proportion of about four in length to three at the greatest breadth. Thus if you draw an egg-form four full inches long, draw the width nearly three inches, and let the upper half be a half circle, and the lower *parabolic*. This figure must be divided in half by a perpendicular line; which divide into four equal parts horizontally; give one to the top of the head, one to the forehead, one to the length of the nose, and the lower part divide into three equal portions. The first part, next to the nose, is the upper lip, finishing at the opening of the mouth—the second, the under lip to the beginning of the chin—and the lower third contains the chin. Touch with your pencil a mark for the top of the forehead, at the uppermost division; then sketch a faint line across the oval at the top of the nose, as the *bottom* of the forehead; another at the third division, for the bottom of the nose; another for the meeting of the lips, and a mark for the top of the chin.

Next divide the length of the nose into four equal parts; giving one part for the height of the wing of the nostril, and one from the top of the nose for the line on which the eyes are to be situated, and there will remain two parts, or half the length of the nose, between the eye and the top of the nostril.

Then draw the line for the eyes parallel to the centre hori-

zontal division, which crosses the face at the bottom of the forehead and top of the nose, and divide it into five equal parts. One part is the length of an eye, and you thereby have the exact length of an eye between the eyes: divide this space into three, and the middle division will be the breadth of the bridge of the nose. The width of the nose, including the wings of the nostrils, is the length of an eye: the mouth is a little more. The eyes open to about *one-third* their length.

The iris of the eye is a circle of one-third the length of an eye; the inner dark circle, the pupil (or sight of the eye), is full one-third of the iris. The eyebrow is the length of the eye, and is about the width of the opening above the upper eyelid. The *bottom* of the ear is situated on a level with the *bottom* of the nose, and the *top* of it is level with the *eye*.

In profile, the *back* of the ear, the *top* of the forehead, and the *point* of the chin, form an equilateral triangle.

With this arrangement, you might sketch a good *situation* for all the features, which you should practise as soon as you have learnt the drawing of *eyes*, *nose*, *mouth*, and *ears*, separately, as large as life-size: for which there are good examples to be obtained. I think the *rudimental* study of the *whole* figure, should never be less than one-fourth of life-size; which may generally be about one foot six inches high.

Perhaps there are few heads that are precisely to these given proportions. In what is denominated a *long* face, the eyes will be on the central horizontal line of the face, and the eyebrows, then, will be placed one-third, or the opening of the eye, *above* the eye.

It is not, however, the business of this stage of study to diverge from given rules into the various exceptions, which the influence of passions and expressions may suggest; nor, on the contrary, to consider these *rudimental* truths as the ultimate end of your study. The best possible means of commencement are often very unlike the end—for instance, the getting into a coach at Bath, is very unlike getting into London; yet a traveller from thence for London, would find it one of the most expedient preliminaries for obtaining such end.

You must study from the *very best* examples. Raphael,



“Morgan’s Antiques,” and “Cipriani’s Drawing-Book,” are of this class. There are many other elementary books of extremities of the human figure; many of which, although pleasing to the eye and the fancy, are too incorrect.

In your own studies, habituate yourself to the most severe criticism, and you will so correct your work as to render other criticism more approving than severe. It is a weakness to say, “There is *something amiss* in my work, but I cannot tell what.” This *may be*; but it is too often a dread of the trouble that would follow the discovery, which thus blinds you to your own errors when *copying*.

But when you *sketch* an ORIGINAL design, your natural taste and judgment may be greater than your skill, so that you may discover the imperfections of your work, and still be unable to correct them. It is very easy to discover the error of a *time-piece*, so far as to say positively that it does not go well, when, perhaps, to correct it, would require the utmost skill of the mechanic. You must, therefore, practise and study patiently for the accomplishment here required. I think it unreasonable to check those who find out the faulty parts of any work, by the too common remark, “that those are not qualified to find faults, who do not possess the abilities to correct them.” But I advise imperfect critics to express only their *approbation* or *dislike* to what they do not understand; instead of committing themselves, by either praising or condemning—especially *aloud* in public exhibitions. The truth *kindly* advanced, cannot be entitled to the severity which ignorant self-sufficiency would stigmatise it by, and they are bound to the humiliating level of that truth, which affirms that, “Fools *silent*, often pass for men of wit.”

Take care to avoid the partial (and perhaps ignorant) encomiums of your acquaintances, as much as possible: indeed, the *bits* or *parts* you may have as yet studied being no pictures, few besides an artist will be qualified to pass a genuine opinion of them.

## LETTER VIII.

## DIRECTIONS FOR CHALK-DRAWING.

MADAM,

IF you have duly attended to my advice, I may fairly conclude that you can now manage your *pencil* freely: and I hope the rules for beginning a copy, and an acquaintance with the proportions, have enabled you to make some correct outlines. When you find yourself thus qualified, it will be proper for you to enlarge your style, and use *chalks*.

There are three sorts of native chalk—*black*, *red*, and *white*; and of the first there are two natural sorts—the one is hard, and is called Italian chalk; the other is softer, and is French chalk.\* They are generally used on coloured paper manufactured for the purpose, which has a silky surface. The most agreeable colour is grey, it being a sociable tint to both the black and white chalks. Charcoal, to sketch with, is necessary in this sort of drawing; and paper, or leather stumps, may be found of use: they are generally provided along with the other materials I have mentioned; as also port-crayons, to fix the chalk into, which are indispensable.

The modes of using the chalk are various, each draftsman adopting some peculiar method of his own.

The best system *I* can give you, is, to draw a *correctly-proportioned* outline with the *charcoal*; and, as you find your outline improves, continue to touch more boldly, noticing the breadth and form of shadows, and the most conspicuous markings of shades in the features, limbs, or draperies. The certainty that this can easily be cleared off with crumb of bread, must not lead you into a *careless, dirty* method of using charcoal; for, with proper attention to its soft texture, and a mind intent on the success of your drawing, you may acquire a

\* There are black compounds of the chalk kind; but the pastile known by the name of "Conti chalk," is by far the best for blackness, and works very freely.

tender elegant touch, and produce nearly as fine a drawing as with any other material.

Proceed with your charcoal almost as cautiously as though it could not be rubbed out; this must make slow progress at first; but be assured if you make a hasty, erroneous outline with the charcoal, you will have double the trouble with the chalks: besides, if a *true line* must be finally obtained, can any material answer the purpose so well as charcoal, which can be cleared off so easily until all is correct? You cannot begin your sketch better than by attending to the rules I have given you for beginning in general, as *far as respects the leading points* of the figure (see Letter IV); observing, *first*, the *inclination* of the head, which, being drawn tolerably correct, will serve as a point from which all the other situations may be easily determined; taking due measure (with your eye) of the whole field or surface which is to contain the figure or figures, it being the heedless fault of many to *dash* away, without ever considering where the feet and hands may extend.

As a figure may be *eight* heads in height, never begin the head of a standing figure larger than one-ninth or tenth part the length of the paper, and nearly a full head from the top. Observe at the same time the extent of the limbs, right and left, to determine well what situation between the two sides will best bring in all the figure: this (which may be termed "surveying your field," and calculating your extent) will save the unnecessary trouble and disagreeable effect of pasting and patching, to accommodate the want of forecast.

There are those who *value* themselves for such irregularities, mistakingly thinking ardour a sign of genius. Permit me to say, that genius, *truly so*, must be a composition of excellencies; in which the elements of science must unite their powers, *performing* a work *equal* to the thought. I refer to the examples of the great only, whose patient perseverance in the execution of their works was equal to the greatness of their conceptions.

Were the wonderful statues of the Gladiator, Apollo, or the group of Laocoon and sons, produced by a flash of thought? Or was St. Peter's at Rome *completed* by an accidental hit? No: neither had Genius done her part, when Raphael had.

determined the composition of his cartoons.—Such works can only be perfected when genius is *genuine*; beginning with *deliberate inquiry*, proceeding with *knowledge*, and finishing with *certainty*.

Proceed, by carefully observing what parts of the *original* are on a level with each other; what point another may be perpendicular to; or, which way the lines curve, or incline; what *parallels* are to be found; or how much they deviate from such geometrical forms. In this you will have the assistance, and must be chiefly under the guidance and government of your knowledge of the general proportions of the human figure; as given before, for the purpose of helping you in your first contours and compositions. If you should by the above advised means produce only a *tolerable* general sketch of your subject, you may be tempted to look *too fondly on it*; and relinquish your attention to the original, which you first proposed to imitate. I may say, before you have begun to draw it, for I do not consider this first process more than the principal situations or points found, preparatory to your rightly going on—due attention to all these particulars *will not depress* genius, any more than grammatical rules do eloquence; and you must remember that rudimental copying is not so much to be considered the *work of genius* as *the preparation for it*; or, exactly what the practice of field or naval tactics is to the *intended* hero.

As soon as you have completed the charcoal outline, and entirely decided that every part is right, so far as regards *situation* and general proportion of shade as well as shape, you should mark the highest lights with white chalk, with *nice attention*, because the truth of your drawing, *as a model*, depends much on the right *situation, form, and force* of these touches; and the earlier they are correct, the better.

This completes the charcoal, or first process, which can be whisked off with your handkerchief, or a feather, so as to leave a visible trait of your design (take care *not* to use *crumb of bread*, for that would take off too much, and thereby give you the unnecessary trouble of studying the situations over again): the charcoal marks which should still

remain, may give you the unpleasant idea that your drawing will not look clear; but you will be relieved from this doubt, as soon as you have completed your next stage of study with the chalk, which *I* advise should be *the Italian*. Now, although a light hand, and neat correct line, is always to be studied, you need not be alarmed at finding this second outline rather too black in some parts, because after rubbing the whole over lightly with crumb of bread, it clears away all the remaining marks of the charcoal, and leaves this improved outline quite clear, and just visible enough to relieve you from the first degree of concern, which was to settle contours and proportions.

Now take again the Italian chalk, and begin with the head, to draw, improve, and shade, according to your example. It is a good way to lay all your breadths of strongest shades first, and the more tender shades in succession, rather under their full depth, by regular strokes, forming masses, and increase their force by crossing them in an *oblique direction*, never straight (on the human figure), nor *directly* across, as that would produce a very ungraceful effect.\*

Look to *good* examples, and practise with due attention, and a graceful *manner* will be the result. If you think *too* much of the arrangement of your strokes, you had better practise in this department of study upon the *most simple* subjects, until a good style of touch will flow naturally from your hand; because a *true* imitation being your ultimate aim, the mind should be freed from all concern, in what may be termed *manual exercise* (before you undertake a work of much importance). The black chalk should never mix with the white, when used on coloured paper, because its colour is always a medium *between* black and

\* There is a plate in Sir John Evelyn's History of Engraving, which explains a good method of arranging the strokes properly, for an engraving; which is, to strain threads parallel and equidistant, tightly, on a deal frame, and place it before a bust, in a horizontal direction; so that the sun may cast the shadow of the threads on the bust. Genius will perceive that this sort of radical expedience requires cultivation, before its advantages can appear; but it instantly shews you the beauty of that undulating line which follows the articulation of the muscles, or folds, with truth. Accomplishment in *this* is of the highest importance to *line* engravers.



white, and should be left clear, as far as its tint answers the purpose; thus the hand will obey the *truth* and *beauty* of your conceptions to their utmost extent.

The *stumps* may be useful in diffusing a breadth of shade to gain a speedy effect of back-ground, or any other broad mass; take care that the use of them does not give you a *hasty manner*. The Italian chalk, being very compact, flows best from rather a firm *light touch*, than by pressing too hard: practice and attention will accomplish you in the proper use of it. Always cut your chalk *from* the point, directly the contrary manner of cutting a black-lead pencil.

Crumb of bread is preferable to India-rubber, to clear off any error on this sort of paper.

I may now venture to hope that you will require no further instructions respecting the *nature of chalks*. Good examples may be of material service: there are very good academy figures, particularly as specimens of the use of the chalks, after the French school, West, Flaxman, and other masters, to be had at the principal print-shops.

While studying, rudimentally, for a correct eye, let no conceit seduce you into a deviation from your subject, which should be *imperious*, because it is not probable that the small portion of critical determination yet acquired, can be sufficient to enable you to deviate from your example with *advantage*; indeed, if it be judiciously chosen, you will have attained a glorious height indeed, when you *can* deviate from a *proper example* successfully; let this bind you to your subject, till you have attained knowledge, and the right use of it, *by practice*.

And, while you thus attend strictly to your example, great care should be taken not to suffer yourself to be led into a very common error, that of overstepping extremes. A part may be well adapted by a broad, square, and bold decisive marking, for its original purpose (perhaps that of a great height, or distance); and notwithstanding the forcible manner of this may affect your mind, you must be much on your guard as to the extreme, at first, to avoid destroying the whole beauty of your copy, by seizing (I may say) on those very prominent points with too bold a hand. You will have great occasion for this precaution,

when copying from Rubens, or the Cartoons of Raphael; and much greater still, in copying Doringy's prints of them. Perhaps the nicest precaution that can be observed, without a *familiar* acquaintance with the anatomy of the human head, and a knowledge of its subordination to the various expressions of the passions, will leave a proof on your copies that such knowledge is requisite.

I may be considered bold in giving the names of Michael Angelo and Rubens, as seemingly superior to the "charming grace" and "elegant medium," while aiming at that ideal greatness and splendour, which is so imposing in their works: *youth* might as well take a sublime epic poem for a rudimental lesson in language, as *begin* the art by studying them.

If, in taking a portrait, you find any feature remarkably large, or wanting in beauty, you surely would not be so unfavourably punctual as rather to increase than diminish disproportion. It may be useful to some, to mention a few more instances where this sort of precaution may be of great service. The book of heads expressing the passions, after Le Brun, may best serve this purpose, as it is likely to be in the possession of most students; in almost every attitude, expression, and feature of which, you will find that sort of *extreme*, beyond which, error would increase, and the character be thereby lost;—and if you should study from the outlines by Cuzzens, called "Elements of Beauty," you will have to avoid the opposite extreme, as they are put forth as such, with a view to show how much expression may be given without that forcible marking which Le Brun has thought proper to his purpose.

It would be presumptuous in me to depart from the sphere of my humble pretensions (that of directing the hand), by borrowing the language of my predecessors and superiors, on the right formation of a painter's taste and judgment, while I can refer you to the writings of Leonardo da Vinci, Algarotti, Du Fresnoy, Richardson, Sir Joshua Reynolds, Barry, Fuseli, Opie, Sir M. A. Shee, etc.; whose writings have most *ably* exonerated me from a task I should otherwise have endeavoured to perform, rather than suffer the incongruous fancies of youth and inexperience to proceed in error and un-

certainly. An acquaintance with the writings of the above-named authors IS INDISPENSABLE to those who aim at *eminence* in the art, especially to such as are highly gifted with that propensity which binds them to the practice of it.

## LETTER IX.

### ON APPLICATION, AND PENCIL DRAWING.

MADAM,

PERHAPS it may now be necessary to caution you against too much, or rather too long application at a time, until you are constitutionally habituated to the practice of the art: nothing can be more hurtful to the mind than *anxiety*. Ambition is often the parent of overstrained endeavour, eagerly wishing to attain the end instead of a deliberate investigation of the means, which is generally repaid by disappointment.

There is a proverbial remark established against the English, that "they cannot let well alone;" or, in other words, they "know not when to leave off." This may be most applicable to those who know not how to begin, proceed, or finish, by the scientific principles of the work they engage in; but dashing or groping on with blind ambition, taking chance for their guide, exhaust their powers in endless and fruitless labour. Great are the errors which *self-teachers in particular* fall into, through that impatience and want of proper thought which is too often the attendant on inexperience; who, like unprovided travellers, wear out their energies in obligatory returns for indispensable necessities, until habituated to their blundering precipitancy, and its dilatory and laborious consequence, they most probably relinquish the wished-for accomplishment with mortification and disappointment; unless the ridiculous consolation urges them on to mistake motion for progression, or to calculate the quantity of their merit by that of their labour; like the wagerer, who undertakes (within a stated time) to pick up a hundred stones laid a yard apart, one at a time, returning to the starting-place with each stone before he starts for the next; going nearly *eight times* the length of ground necessary

for collecting them, and all for the vain purpose of throwing away manual dexterity unworthily, or the pernicious delusion of gambling, to which no honour can ever be allowed.

Talent is too great a gift of Providence to be fooled away on uselessness, and especially to be the tool of vain ambition. The only successful ground for talent to ripen on is, the *cultivating acquaintance with all such mathematical aid as can be applied to its service*. No opinion or argument can move or alter mathematical demonstrations: they dictate perfect laws—they require no art of rhetoric to confirm them—none dare attempt the confutation of **WHAT IS**, and is proved, and known to be nothing else but *what it is*. Truth is its sublime standard, and all true geniuses rally round it.

Never suffer yourself to fall into such errors; but study with a cool mind, and consider well the effect you ought to produce, having patience with the process, being anxious only in an inquiry after the *right means* of success. This, although according to the most salutary proceeding, will exhaust the faculties of young students, and should be seasonably relieved by recreation, exercise, and refreshment, but never to total neglect: “the pencil should engage your entire attention some considerable part of *every day*.”

The fine arts depending on an ingenious power of advancing directly against the general current of common necessities, propensities, and depravities, cannot expect to proceed up *such* a stream, without vigilant exercise of this power. And no farther relaxation is meant, than sufficient to preserve it unimpaired, which may be properly regulated by a prudent attention to your own constitution, and the general rules of health.

P.S. You desire to know my method of *finishing* black-lead pencil drawings; it is this—I generally have made my *pencil portraits* without any other back-ground than the clear paper; and to obtain a similar effect with my subject, I place up a large sheet of white paper, or a napkin, a little distance from the head; in such an aspect as to form a white back-



ground; which shows me the force required.\* I then proceed to make my whole outline as correct as possible, and then lay all the breadths of shade by tender hatchings or strokes, which I blend and soften a little with a *hard stump*, made of writing-paper: it is a very nice point gained when you are able to make *this stump properly*; the *middle must* be rolled *close*: if there be the smallest hole up the centre, it will not answer the purpose. A thick card cut to a point is a good substitute; paste several together, so as to make the stump like a pencil.

Pay great attention to the model while stumping, so as to preserve all the lights, and leave the shades tender enough to require finishing with the pencil. This must be done with very compact lead: Brookman and Langdon's pencils, marked H B to begin with, and H H to finish with, are the most suited to *my practice*; which, after cutting to a tolerable point, should be rubbed on paper, to produce that *fine smooth point* which is often required in the minute marking of a small drawing. I draw on Whatman's *thick* wove post paper, *hot-pressed*,—or others as good, but I find none *better*. To prevent the paper from being indented by the strong markings of the pencil, I lay a piece of plate-glass under it while drawing, which preserves the surface of the paper quite smooth; but a sheet of miniature-painting ivory, properly smoothed, or Fuller's *ivory card* is as good, and is portable. The less rubbing out the *better* in these minute works. If you choose to give up the smoothness of the paper, you may fix the pencilling, by soaking it in sweet *skim* milk for a quarter of an hour; then *draw* it *carefully* out of the milk, and let it lie *aslant*, to dry *gradually*, moving it sometimes, to prevent its sticking to the surface you dry it on: this must *not* be *hot-pressed* again, as in that case the pencilling will again be liable to rub out. You may paste it on a hot-pressed card, which, if carefully done, will nearly regain the smoothness of hot-pressed paper; or it may be passed, when cold and quite dry, through a rolling press, laying a sheet of *polished* writing paper over the front of the

\* This is the very best way of obtaining a true effect, when studying *flowers*, or *fruit* from nature, or *anything* that is to be finished on a *white ground*.



drawing. You will find it require *practice* and *study* to make this information of much service. One cannot write a recipe for producing a *fine picture*, although it is easy enough to explain a process: (METHODS ARE LIKE KEYS, THEY HELP TO OPEN DOORS, AND SERVE NO FURTHER). Be attentive, and have sufficient patience with yourself, and remember *your motto*, "*Perseverance*."

## LETTER X.

### INDIAN INK, AND RULES FOR LIGHT AND SHADE.

MADAM,

WE have hitherto confined our proceeding to the *black-lead pencil*, and to *chalks*, but as your studies produce good drawings, they will deserve to be finished with more permanent materials; therefore, when the student has acquired a competent acquaintance with *forms*, and a thorough command of hand in expressing them—there cannot be a more beneficial practice than that of acquiring a perfect acquaintance with the use of—

INDIAN INK, the most *common*, and perhaps the most useful, of all the water-colour class; being a fine deep black, which can be varied with water, through every degree of shade, till it falls imperceptibly into light: there is not any composition equal to it, for the general purpose of shading. It is *much counterfeited*, but the adulteration may be detected. The *true China ink* will break to almost a polished surface, and is *moderately* scented with musk. The counterfeits generally overdo this; and others neglect it altogether. The true ink is the blackest when brought to a *deep* shade; but in the fainter shades it inclines to *brown*. The counterfeits have more substance towards the deep shades, than the genuine. The *true*, preserves a greater degree of transparency than the other.

To use Indian ink conveniently, you should provide yourself with a slab\* of earthenware, or marble, with several dells, to

\* My ULTIMATE DIAGRAM-SLAB is the only article of the kind that has any other use besides that of holding tints, while *this* not only answers that purpose

hold the various tints: the largest is to contain pure water (never begin to shade a drawing without having a vessel or two of clear water, besides what is contained in the slab, and a *sponge* to clear the slab when requisite); there is, generally, one long dell in the common slabs to rub the ink in, the other three are for three gradations of shade, which you should prepare with nice attention, making the quantity of each fully sufficient to serve throughout one season of your study. These three degrees of shade, with the portion you *first* rub up (which should be as *strong* a black as the ink *can* produce), will give you four distinct shades; which, with that ingenuity requisite for a hope of success, you may, by *due practice*, adapt to all the shades attainable from this material. They may be compared with the four strings of a violin, and the gradations they are capable of, will bear equal comparison with the various tones of a musical instrument, each, under the management of a skilful hand, producing the most charming effect.

*Pause here*, and be convinced of this, in the exquisite prints which now delight the mind, they, you will be convinced, are complete with various tints of black alone, on a white surface.

The mechanical means of softening and uniting gradations into a broad and natural appearance, are to compare the *depth* of the tint in your pencil, with the depth required in the drawing, carefully avoiding too full or too dark a pencil (but this depends on the extent of space that you have to cover, and on the depth of the tint): but rather have to touch thrice, than touch once too dark, using *various sized camel*, or *sable's-hair pencils*, according to the breadths you have to lay. The too common practice of putting the hair pencils into the mouth must arise from *absence of mind*: because so disagreeable and unwholesome a practice will not bear a thought—use *trying* paper to prove your tint, and to bring the pencil to a proper point and fulness.

fully (having *thirteen* dells or pools), but also teaches the first lesson on the right formation of all the distinguishable colours (see Letter XVI.), by mixture of the *THREE PRIMITIVE*, *YELLOW*, *RED*, and *BLUE*, descending incontrovertibly to orange, green, and purple, and, lastly, to olive, brown, and slate, concentrating into black.

You may unite great amusement with improvement when practising for facility in the *use* and *management* of India ink, which, however, I cannot advise you to, until you can outline correctly—then, if you are charmed with the *whole effect* of any picture, or print, and would copy that *general effect* only, set your subject at such a distance as to render all the minute parts indistinct, so that you may only perceive the various shapes of the leading masses, lights, and shades in the picture, which you had better notice with due correctness by *outlines*; this done, prepare your four degrees of various shades of India ink, and proceed to use them in general shape and depth, as you see them in the original. These broad productions will increase your acquaintance with effect and the use of the materials; and when you can accomplish this successfully, you must not let it gain an ascendancy over that requisite attention which is due to a *perfect copy*.

The following 5th, 6th, 7th, 8th, and 9th rules, will help you in the process of these broad experiments, as well as in more elaborate studies,—but I cannot, as an honest preceptor, encourage much repetition of these slight and off-hand effects, to any but accomplished practitioners, who no sooner perceive some picturesque object in clouds, stained or broken walls, or in the various formations of the fire, etc., etc., than some valuable sketch is added to their stock; *it is through previous application to the rudiments of their art* accompanied with *genius rare*, that this sort of sketching is *availably* resorted to. A young and inexperienced genius might feel impressed with *ideas* of as beautiful imagery as the accomplished one—but it could be only in “idea,” he could not give a local form to his conceptions; therefore, you must not, as yet, be seduced from the attention due to practical knowledge by the fascinating ease with which *general effects* may be produced, for be assured, that after you have gained full acquaintance with the manner of using Indian ink, your best application of it will be in the studying the individual productions of nature, thereby acquiring a sufficient fund, or stock of materials, to form into any picture that thought or accident may present to your imagination.

## GENERAL RULES

To be observed in shading, when designing after nature, or preparing studies consonant with natural effect.

## RULE 1.

THE greatest distance in an *open scene*, with a *clear* sky, will always be the *palest*, or lightest; both sky, land, and water.

## 2.

The greatest distance, in an enclosed scene, will always be the *darkest*.

## 3.

The *nearest objects*, or those in the *foreground* of an open scene, will have the darkest shades, and purest lights, when considered independently, or separated from their local colours, which cannot affect this rule.

## 4.

Objects which are exposed to the light in the foreground of an enclosed scene, such as the entrance of a cavern, or *any other* recess from the open light, will have the same degree of dark shade, as objects in the foreground of an entire open scene: because the dark distance, or background, is accidental, and will not affect them; although they will appear (on *slight* observation) to have fainter shades than objects opposed to an open background, and will appear narrower than objects opposed to the light.

## 5.

To adapt a picture to the power and properties of the eye, you must, on all occasions, lay as tender, gradual, and *imperceptible* a shading tint as possible, at each corner of a square, or oblong drawing, blending it sweetly off towards the point of sight, so as to give the surface a *concave appearance*. The same should be done towards the margin of a circular or any other

shaped drawing; *always* securing *this natural concave effect*, before you commence your work on the detail of the absolute scenery; after which you may proceed in the same manner you would have done, had you not been aware of this optical preparation. This I learn from "Claude" and *all* thorough masters; it is the aerial perspective of the first *rule*.

## 6.

Always begin the sky and distant masses of shade with the pale tint; and, as you approach the foreground, increase the depth of the tint, observing to be light enough at first.

## 7.

When the shade requires additional depth, do not take a darker tint for that purpose, but repeat the use of the original tint; deepening the shades of all the various degrees of distance with its own tint, or the object will press too forward. Make all the instruction given in this letter familiar, previously to the study of the following rules.

## 8.

*When first laying on the broad masses of shade*, pay no attention to the *reflected lights*, which always fall on such parts as are out of the influence of the principal light, as the first lays should not be darker than those reflections: if this is properly observed, you will produce all your reflected lights by your next process; that of increasing the shade of those parts which are more remote from the influence of both light and reflection (in all their various degrees of distance); recollecting that although no light falls on them, they must not be made darker than suits the distance in which they lie; because the law of the first rule given, remains in force.

It is the property of light (when considered only as the means of illumining objects) to continue so at all distances, and in appearance to prevail over all such shades as are occasioned by unevenness of surfaces, in proportion to the distance of such surfaces from the eye; so that the cavities, or various causes of shades, lose their force, while the smooth and projecting parts



continue their local lightness, and are (in effect) united by distance into one mass, or (apparently) smooth surface; and, inasmuch as such mass is composed of *shining* materials, will the reflection of sky, at its *proper angle of reflection*, be apparent (whatever its tincture), instead of the known and local colour of the mass. This with the intermediate atmospheric matter, and the decreasing power of sight, according to distance, prevents your seeing the dark parts as dark as in the foreground, and accounts for the colour of distant land. (See an extract of a letter to my son George, in my twenty-second letter.)

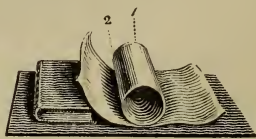
## 9.

Your next regard must be to those shades where *light* and *particular reflection* are absent; but where some *general* reflecting power has influence enough to render the part lighter than those *entirely* void of light. This, with Rule 8, produces the reflections by leaving them.

## 10.

Parts which are strongly reflected on are very deceiving to young copyists; they generally mistake such reflections for lights, and leave them much too strong; for there is a *great difference* between such parts as receive the pure light, and those which are only reflected on by a surface which receives its light from the first cause. To prove this—

Make a cylinder of white card, or paper, and lay one side towards the light, on a sheet of white paper; then raise the sheet of paper on the shaded side of the cylinder till it makes the strongest reflection possible (fix the



144.

sheet of paper up by a book, or the like, while you proceed on your experiment), according to the annexed figure, 144: you must then take a card, or piece of smooth paper, the colour of the cylinder, and hold its surface fair to the light, in a line with the lightest part of one end of the cylinder, and you will find

them exactly alike; then keeping the surface of the card in the same direction, move it back to the reflected shade of the cylinder, and you will see, notwithstanding the force of the *reflection*, that it will be many degrees *darker* than the card with which you conducted the light (which you had proved to be *equal to the light* of the cylinder) to this shaded side: take care to place the cylinder not quite parallel to the light, and make your experiment on that end which lies nearest to the window, or light.

## 11.

Transparent bodies have the strength of their shadows in exact proportion to their degrees of transparency, and are liable to as much reflection as their opaque parts will contain; thus: the threads of fine muslin will receive reflection; but the reflection will, of course, pass through the *apertures* between each thread, which occasions the general effect of transparency, and in *that degree*, the reflected light will be weakened; but with thin paper, leaves of plants and of flowers, etc., there being no apparent apertures, the reflection will be as strong as on opaque bodies; but not so distinguishable *AS reflection*, on account of the transparency, because such surfaces are lighted on both sides, that is, *real light* on one side, and reflecting light on the other.

To be able to discriminate between reflection and transparency, according to their true properties, will be found a very great accomplishment, when engaged on such subjects as require it: it may be some source of refinement in your work, to be *aware* of the distinction.

Transparent cylinders and globular bodies, such as the stalks of some plants—the white currant, and grapes, receive a strong light through their bodies, which settles, visible to our sight, on the concave or inner surface of that part which, but for their transparency, would be found the darkest, if not reflected on by some neighbouring surface; this is often mistaken for reflection, and as often liable to the instruction given in the tenth rule: for, notwithstanding the rich glow seen on the remote side, the breadth of light on the originally illuminated

surface, must always govern in true degree, and will always contain a much superior light, except when the cylinder or globe be of colourless glass, containing colourless matter, such as spirits or pure water.

I can only refer you to the general, but unvarying principles of the influence which *light* insists on, in the department of FLOWER PAINTING, as *much* as in the proper treatment of any other object of imitation. I have never practised this branch of the art; but the observations I have made on some of the water-colour specimens of fruit and flowers emboldens me to offer a positive rule—Where *light* is absent, *colour* will be absent in equal degree. When you mean to leave a white background, set up one behind the object of your study, in such an aspect as to appear white, and, with *due* consideration of transparency of objects, weigh deliberately the advantage of searching out and expressing, *all* that must be *shadow*; before you see, or rather reckon on colour; this successfully understood, will give every part its proper substance, and relief; approaching the effect of reality, when properly finished by colouring.\*

## 12.

Shadows of solid objects on level planes, when the light falls in the direction of about forty-five degrees, are generally about the same degree of depth with the shaded side of the object, except varied by some accidental reflection (or difference of the local colour between the object and the surface its shadow falls on); but this latter part of the exception must not be admitted under the head to which the rule is applicable, namely, *light* and *shadow independent of colour*; but it being a necessary point of consideration, in distinguishing between shadow and colour, it may be of due service to have made the remark.

## 13.

Respecting objects as they appear in the open air, without

\* One of the very best fruit and flower painters of the present day, who had learned of "Hewlet," assured me that this eleventh rule was the best piece of instruction he had ever received.

immediate sunshine, observe, that although there will be one lightest side, yet the general influence of surrounding light, which is reflection, *may* render the shading (that is, the *breadths* of shade) very tender: however, sufficient force will not be wanting to make a good and natural effect, if the rules 8, 9, and 10, are truly followed: much experiment and observation must accompany them all. YOUTH is the time for this.

It would be an informing experiment *on the effects of the different degrees of light*, to separate the influences of the two opposite halves of the sphere by a thin partition of sufficient height and breadth; fixing one side directly towards the sun, and placing a figure or object close enough to each side, that when the student takes a station at the edge of the partition, he may see both figures at one time (provided the reflections which might arise from the power of the sun on the shaded side could be properly prevented).

This might be practised on a small scale, by setting up a sheet of pasteboard (or the like) between two small figures; but it should be done in the *open air*, because the second, or reflected light within a room is too feeble; and the one figure would be too much in entire shade, instead of in a second light.

*Weigh well* the humble degrees of light and local colour *on all other objects in view*, at the time you are viewing a fine sun-setting.

#### 14.

White surfaces, *fronting the eye*, as to *colour* will be white in every part of your drawing, with the general exception of the influence of the fifth rule, and those parts of the white object which are in any degree overshadowed.

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Compare these rules with the effects you will find in good engravings after the best masters; calculating on the effects produced by engravers when their works are designed to represent *colour* (in effect): but when you study for simple light

and shade (which should be first well understood); it may be better for you to make a very good print, that is engraved from *white marble* sculpture, your guide.

The sum and substance of the foregoing rules comprise this final principle—*Light your subject to the most picturesque* WHOLE EFFECT, and *then copy the whole* with *undeviating obedience to that light*; this will produce what is so much admired by the judicious connoisseur, when he says—“There is air in the picture.” GENIUS, with the *utmost aid of scientific* theory, must submit to practical application *from absolute models*, as rudimentally necessary to accomplishment in the practical and mechanical department of painting.

## LETTER XI.

### TO DRAW FROM SOLID OBJECTS.

MADAM,

IN the foregoing Letter you have such general rules of light, shade, and reflection, as will tend towards forming the basis of *practical* criticism in your mind; and, as you now desire to study from statues, or what is termed “studying from the round,” my next endeavour shall be to give you such information as will accelerate your progress.

Let your first essay (in this department) be to imitate a *perfect sphere*, or globe. Your model for this may be any plain globular form, perfectly white; and the larger the better. You will perceive only one point of white, for light; and from that a tender gradation of increasing shade, till you arrive at that extreme shade, where the light loses all power, except what is found from general reflection, or some particular reflection which may arise beyond this shade: if you make several studies from the globe, in different lights and distances, it will confirm an acquaintance with the rules I have before given you.

As you proceed with your study after the “antique,” you must cultivate the best acquaintance with their distinguished pre-eminence over most of our modern examples; for which I must refer you to critical application, and the highly-qualified



pens of those authors I have mentioned in the last paragraph of my eighth letter.

The best point of view that an object can be placed in, for the most harmonious relievó, is, when about “a quarter part of the whole is seen light, a quarter part dark, and the remaining half middle tint.” This rule is given for *whole pictures*, as well as a single figure, and is generally effected (on models) in a high windowed painting room, by the consequent presence of the *under* shades of projections; but you will still find it an improvement on such sort of shades, to view your subject so as to see more light thrown on one side than on the other, according to the rule just given. You will find it improving enough to set your figures in various lights, till it agrees with the rule, which is that temperate medium in which truth of design, expression, and composition display their purity and powers, unaided by the impossibilities of presumptuous ambition, such as at the theatres are called *clap-traps*.

Proceed to study, in every stage of your work, according to previous information: with the additional help of the *rules* for shading. They, although given under the head of *Indian ink* shading, will be found sure guides when using any other material. Various circumstances may render it necessary to deviate from the above proportions of light, shade, and middle tint, “which genius can only dictate;” but take due care to be fully convinced, when you depart from a rule, that it is an improvement according to REASON; *fancy* being too inconsiderate to assume this power, because conviction, as to the *most perfect* effect, can only arise out of deliberate conclusions. Should it be requisite to throw more *light* than the above rule determines, the *depths* thereby wanting, may be given to the picture by adapting something which has its *local* colour, properly suited to the purpose. Let *beauty require*, and NATURE as well as TRUTH, and POSSIBILITY, admit of every *article, form, character, light, shade, reflection, and colour*, in your picture; for the artist who takes a sudden spring at “a grace, beyond the reach of his knowledge,” is as liable to disappointment, as a gamester who *risks his success on chance*: and, perhaps, it may be no difficulty to discover that such disappointments are more frequently

occasioned by *ignorant impatience* than ingenious energy; the fruits of which, too frequently disgrace public exhibitions and then wither away with their authors.

## LETTER XII.

### THE TRUE AND FALSE SHADOW DISTINGUISHED.

MADAM,

I SHALL accomplish a most important point if I succeed in explaining clearly, the necessity of studying, and treating properly, all those parts of a subject which receive none of the original or principal light; but owe all evidences of form, colour, and expression, to a secondary, or reflected light.

Suppose you set a figure fair to the light, according to the directions given for that purpose in my last Letter, and finish a successful study from it. The table you thus set your figure on, should be covered with white, and your background should be the same, as well as the figure, for this experiment; that light, shade, and reflection, may not be compounded with the various local colours of objects, which would otherwise, most probably, surround and certainly affect it; and a true experiment could not then be made without a very competent acquaintance with the interfering effects of colours. Perhaps, when you have made your drawing *completely to the model*, you may imagine that a shadow over the lower part of it might improve the effect of the whole, as a picture;\* and so proceed, as *too many have*, to lay one *uniform tint* over the part thus appointed for shadow. But the truth cannot be produced by this transparent tint, for *it does not operate as a shade would*; it only changes the complexion of the part it covers; the original lights and shades all retaining their force proportionate to

\* Observe, we are still studying the simple effects of light, shade, and chiefly here of *reflection*, by the plain material black in various degrees on a white ground, without any reference to colour; but it is proper for you to know the importance of this material; which is so great, that a picture cannot be a good painting unless a print *well engraved from it*, preserves a good effect, when thus divested of colours.

one another, precisely as the untinted parts, having more the effect of the dirty parts of a half-cleaned specimen, such as picture-cleaners exhibit, than of the truth; which cannot be produced by such a *trick* so as to show the *true effect*, on any part of a drawing, or picture, which had been *previously finished to an unintercepted light*.

If you would proceed according to the truth, you must overshadow such part of your *subject* at the commencement of your study, as you desire to be in shade, and copy all the changes of the effect thus produced. You will do well to study the difference of such effects, by experimental proofs. Set up some plain object, or a figure, fair to the light; and copy it completely as you see it, according to the first directions: then *shade* over part of this copy with *one* tint, or according to what I shall henceforth term the *false shade*: then, without moving the original object of your study, set up something which will cast as much real shadow on it, as your *false shade* pretends to have done on your first drawing. Copy this correctly, and then compare the overshadowed parts of both drawings with this last effect produced by your model, and you will have satisfactory proof why I termed the first a *false shade*; and, inasmuch as you become convinced of the error of such thoughtless dispatch, will your critical judgment be improved. You will then see one of the great causes of deficiency in the works of many of our contemporaries, whose eminence, in many other parts of painting, might vie with the painters of any age. The subjugating or qualifying impalpable shading, taught by Rule 5, Letter X., will always be required for the whole picture.

I will venture to affirm, that the term *false shade* would not be improperly applied to much of the work that is done to an oil picture under the term "*glazing*." All the effect you wish to produce by *glazing*, should be really produced *on the object of your study*, by appropriate overshadowing and reflecting *materials* previously set for the purpose.—I speak this to *young essayists* in historic composition *chiefly*, but the *principle* must be strictly understood and observed by *all* who are ambitious of

displaying beauty by the *truths* of nature; and to such only can scientific consideration be useful: for such as are content with the maintenance to be obtained by smearing canvasses *pretty much like* pictures, are safe on their *sunken rocks* (PRIDE, IGNORANCE, or AVARICE), from all other considerations; but as their trash floats on the surface of the general stream, it is surely prudent to point it out in general terms for the benefit of true genius and industry, and their LIBERAL ENCOURAGERS.

You should remark, that in *absolute shade*, or the *entire* absence of light and reflection, there could be no variety of light and shade; and whatever beauty and variety of folds or articulations, may be found in the light, will almost suddenly discontinue, where *such* a shade meets them, and the shaded side would be a *flat breadth*. I have made this remark to an extreme that will *seldom* happen; but it is to warn you of the error of shading, and marking folds or muscles, etc. too distinctly, when *light* (which is the distinguishing power), or *reflection* (which is its auxiliary) are *materially* absent: this you *should prove by due experimental conviction*, which is absolutely necessary to your rightly comprehending the force of my advice.

Now to return to the real object which I have advised you to overshadow: observe that those parts which were originally in shade, are not sensibly darkened by this *second* or *real overshadowing* experiment, while all the originally light parts are; in the same degree as the power of the original light is prevented, and those parts of the original, or first folds, etc., which were then the darkest, will, in many instances, become the lightest, *by reflection*.

Whereas a *uniform tint*, such as I hope is proved to produce a *false shade*, would increase the strength of the shades in the same degree, as it shaded the light parts (precisely, as I said before, like the dirty part of a picture-cleaner's specimen); it could never produce the transposed effect of an overshadowed part upon any drawing or painting *previously finished* without having first overshadowed your object; for all such shades and reflections should begin and proceed according to an example, critically understood, and properly set for the purpose.



\* “If the *overshadowed* muscular forms, folds, and articulations, were left *as flat* in a picture, both with regard to colour as well as shade, as they would positively appear in *such* overshadowed situations, the beauty and force of the whole might prove, that much of the learned *markings* of some artists is employed to the disadvantage of their pictures, through a too tenacious endeavour to display *their knowledge of the form*, rather than their faithful submission to the *effect* produced on it by the supreme power of *light*: for if all the *conspicuous parts* are to be strictly conformable to nature, with regard to light, shade, reflection, and colour, it follows (in my mind) that all the subordinate parts should be studied through all their gradations, according with the same conformity, *as they would appear* under their respective shades, when associated with the leading figures and circumstances of the same subject, and under the influence of the same light, shade, and reflection; instead of which it too often happens, that after studying a model of the principal parts of a picture, the remainder is made out by unscientific recollections and suppositions,” expecting to com-

\* The substance of a letter addressed to the late Mr. West, then P. R. A., which obtained me his particular friendship, and most candid concession to my argument; he had then the finished sketch on his easel of “*Christ rejected*,” and desired me to make every remark on it which appeared contrary to my opinions of truth. I apologised for having involved myself in a difficulty from which only my silence could release me. He said, “I fear the GREAT STYLE of art will annihilate your schemes; but let me have your thoughts.” His “fear” raised my conceit; and, begging his patient attention, I said, “Suppose, sir, three miracles could be wrought to prove the force of my proposition—will you allow me so to explain my meaning, by *first* supposing the picture before us to be the *real life*, and every circumstance in it *real*? *Secondly*, that they could all continue in their proper positions, actions, and expressions, unchanged (until you could have completely copied them) under the *Third* miracle, that of the *light* which you have determined on continuing unmoved and unchanged throughout your whole work. My question then would be, *Wherein would you deviate* from the whole, or any part of the scene *thus miraculously* offered for your imitation?” He said no more of “*the great style*,” acknowledged the clearness and fairness of my thoughts, adding, that “painting required intense study and consideration;” and then invited me down to his painting-room, to give my opinion of his large picture of the same subject; but as I had so far succeeded without bringing my judgment home to him personally, I carefully stuck to my metaphors, and left him to apply my thoughts according to his own discretion.



bine one great and pleasing effect without the mechanical drudgery of inquiring for the INTEGRITY OF CAUSE, through too great a conceit of competency. This pernicious sort of self-sufficiency, being the offspring of pride, laziness, or impatience, if not of avarice, should be combated with the most impartial self-examination; for although perhaps a genius, still some, or all, of these frailties may conspire to mar the success of a picture, and destroy the truth of half with the beauty of the whole, by *thus* substituting facts with unskilful ideas and unharmonising fallacies, for which *even poverty* dares not apologise.

Genius, imagination, and science, with *thorough comprehension* of all that is requisite to a whole composition, may express the *idea* of a picture most forcibly, and perhaps beautifully, in what is termed the *sketch* of the design, which (I think) may be compared with a well-digested architectural design for an intended edifice, the *absolute work* of which must be the result of the *accomplished* mechanic. And to this sort of mechanical accuracy must that artist submit who proposes to advance in painting beyond the reputation to be gained by a good *sketch* of a subject.

### LETTER XIII.

#### ON THE ARBITRARY POWER OF LIGHT.

MADAM,

WITH regard to the *licences* to be allowed in painting, I shall give you my opinion as an adventurer on high ground, liable to the investigation of others; but if such are only *speculative critics*, my opinion will remain unanswered.

Should philosophical *demonstration* prove me to be either *entirely* mistaken, or too confined in my observations, I shall not regret the result, because truth ought always to triumph over error; and I shall have this apology for what I advance, that my remarks arise from cool and deliberate experiment, amounting to the conclusion that life is too short for one to *spend time* in a *systematical* endeavour to make *wings*, *because of the certainty there is of the inutility of such artificial invasions of nature*. And as Archimedes saw the limits to mechanical

power by a rational declaration of the "*want of further means*," I feel in like manner supported in my decision on the objections I am induced to make against any *serious* endeavour to effect the *representation of light within* the picture as a CAUSE of the other lighted parts of it.

And it is proper that the limits of possibility should be scientifically ascertained, that we may be enabled to distinguish clearly between the seductive flights of proud conceits, and the sedate power of TRUTH.

First, that absolute *dominion*, which is the natural property of LIGHT, must on no consideration whatever be invaded by what is termed "*poetical licence*." For truth cannot be advanced by false means; and as regarding the "*great style*," or what may be considered the *sublime*, I believe "*perfection*" to be one of its principal constituents; and it surely must be admitted that *truth* is indispensable in the pursuit of it: still a painter's licence, or liberty, is amply sufficient for the successful accomplishment of the *possible* aims of genius.

The unbounded fields of imagination and invention, history, poetry, and nature, are all dedicated to his use: he is at liberty to choose the most interesting subject, and introduce such an association of objects, as may best suit his purpose; in doing which, should he commit himself to the censure of critics of this department, I leave the case between them, and abide by my subject; namely a rational objection to the liberties taken by *too many* painters contrary to the dictates of LIGHT.

After a painter has designed his whole subject to his satisfaction,—the liberty of *choosing freely* both scene and season as to *light*, and its operations and consequences, must be granted; *which, once determined*, and genius having hereby prescribed to herself laws, must, throughout the whole work, remain subject to them; and, notwithstanding the magical and harmonious powers of those who have succeeded in *rendering error pleasing*, still *light* and its consequences (*shade* and *reflection*) should never be tampered with, but on all occasions should be implicitly obeyed.

This may be sufficiently proved by modelling a whole subject, and placing it in a *suitable* light.

It is worthy serious attention, to consider how very different the light, shade, reflection, and colours of an object would appear in an open *landscape*, or on the clouds, or water, to what it must in an artist's painting-room; yet how common it is for the inconsiderate to make the design, whatever be the intended scene or background, and then set figures, draperies, etc., to the light of\* a *small high window*, copying too faithfully to stand a chance of unity with (perhaps) the heavenly scene chosen for the subject. The original sketch, for the general effect of which, from the hand of a scientific genius, might be delightful, and very likely nearer to a natural *whole effect* than the finished study, because here the mind is unrestrained, and unconfined to absolute models under erroneous lights. They do well who endeavour to remedy these unsociable circumstances, by placing such lights and colours round about the object as may best tend to produce the required effect: this would ensure a *certain degree* of concordance, which, if they are happy enough to imitate, they will be amply rewarded for their obedience to **THAT POWER** which is superior to all control; and its effects are as much above improvement as its cause surpasses the power of comprehension. Let it be recollected, that there is no objection to a painter's choosing an appropriate light, or even lights, to paint *by* (*not to paint*, because he is not possessed of any material *light enough*); and of modifying their powers and shades, by harmonising reflections (with *appropriate materials really set up*, for the purpose; at least, while a novice in the art), according with his idea of what is best adapted to his subject. It is his

\* The glass of the painting-room window should be as clear as possible (*the very best German sheet at least*), for the common window-glass is so green, that it lowers the brilliancy of colours; and care should be taken to obtain a northern aspect, in order to avoid the glare of sunshine, or the necessity of covering the glass with a thin opaque wash, for such covering must diminish the light; the pernicious consequence of which, *on colours*, must be obvious; and as *clear light* is of so much importance to the brilliancy and *truth* of colouring, it would be well to have *two* sliding sashes, when the painter's aspect is liable to sunshine; the *one clear*, and the other adapted, by ground glass, or thin wash, to soften the strong power of sunshine, so that all the light obtainable might be had by using the most suitable medium, and by all means to leave the light *entirely uninterrupted*, when practicable.

rebellion against, or inattention to, the *power* of light, after having placed himself under its dominion, proceeding under the random impulses of fancy and vanity, without any allegiance to the causes of successful effects. *This* is the objectionable point, in *which*, should he persevere, his designs, compositions, and expressions, his contours, characters, and costumes, may be admirable; but his effect will be *unnatural*, and as wanting in sublimity as of truth and unity.

There is always something pleasing, and often surprising, in a natural effect: the vulgar are delighted they know not why, while the accomplished connoisseur pays the willing tribute of *encomiums due to intrinsic merit*.

*Reflection*, and its effects (by which is meant, the appearance of all [except *glittering*] objects when under the influence of a certain LIGHT) *may be* imitated: LIGHT ITSELF *cannot*. It is a vain fancy, and an amusing delusion, to endeavour to represent that LIGHT which causes the lights and shades of the scene or subject of your study; such as a *moon-light*, *candle*, or *torch-light*: and, chiefly, the *sun* above the horizon, which, at best, can only be termed the *pantomime*\* of painting, or the *sportive* essay of fancy—which, lying above the powers of *painting materials* (excepting by the aid of transparencies) should not be treated as claiming *rudimental* aid, while the *more solid* and *possible* branches of the art are neglected.

When I consider what Claude, Rembrandt, Rubens, Vernet, Vanderneer, Schalken, Wright (of Derby), Turner, etc., etc., have attempted, and how completely they have succeeded in gaining the *admiration* of the most professed connoisseurs, I should hesitate to advance these remarks, although founded

\* Admitting the sword of harlequin to constitute him a magician, and that all the transitions of a pantomime are produced by virtue of his sword, the objection will not bear the comparison offered: because, if the scenery and machinery are perfect and dexterously worked, the delusion is perfect, and most so to the most ignorant. Whereas, the painter cannot produce the *natural effect* of the full appearance of a sun, moon, or candle light in a picture, so as to deceive the rational eye, or to go farther than *indicating* an ingenious intention; and I believe it is never *seriously* attempted by scientific artists; and that for want of that "*magical sword*," *adequate materials*, which, the two extremes of the whole system of painting materials are not.



on, and derived from *truth*, were they not supported by the MORE SUCCESSFUL examples of the very SAME masters; inso-much as to embolden me to assure you, that much as the spirit of *such enterprise* may fascinate; a truly successful result can never be accomplished, while the powers of a painter are confined within the humble limits of WHITE and BLACK pigments.

Yet the works I have alluded to are charming!—they are captivating! Cool judgment is arrested by the glowing harmony of Claude, the vigour of Rembrandt, and the surprising effects produced by many other masters on similar subjects. Should it be asked, Are these *effects true*? it may be answered by a question,—Who can exceed them? The answer to this may safely be—“No one can surpass what has been produced by several great masters in this department;” but all this does not overcome my dogma, “It is only a balloonist’s flight *towards* the moon.”

It requires but little science to prove that *white* is not light, but it is an effect produced on a colourless object by light; and, if you go to the other extreme of the painter’s gamut, you will find that black is not the utmost depth of darkness, but only the greatest possible opposite to whiteness that can be produced on any substance, when exposed to the light; and between the limits of these MODERATE EXTREMES a sincere artist will confine his efforts, and never use the seductive art of gaining fame by a *splendid error*.\* The licence necessary for allegory, or symbolic painting, may be submitted to: some intimation of lights may often be found proper to the theme, and answer the painter’s purpose completely as to the point of illustration, but very little further.

There is another great licence taken, which, in my opinion, is practised through a preference for gaiety rather than truth, which is the introducing *two opposite* effects in *one picture*.

There are pictures representing the sun setting, or near that position, generally and judiciously kept by rich tinted clouds

\* Shining draperies, such as *white* silks and satins, have their real and natural light parts much above *white paint*, the imitation of which *must sometimes* be affected; but never can be *effected* but in a comparative degree.



delightful to the eye: this, of itself, is as fine as genius and art could produce. But this fine effect is often opposed by *another*: a *portrait*, or *group*, perhaps historical, or poetic, is introduced in the foreground; with a *broad* and *pure light* on the *parts towards us*.

Now it is to be considered that there is no power in the east, when the *only* sun we have is setting in the *west*, to enable a painter to produce the light which is *so often* found on what you will understand to be the east *side* of his figures, when the sole cause of all the light which there is in the hemisphere is rapidly, although so imperceptibly retiring on the *opposite side*: whereas (notwithstanding the strong reflection which you may imagine from bright clouds in the west), the eastern side of all the objects in *such* a scene *must* and *would* be the darkest side.

It has been argued, that by intercepting the western influence by a wall, curtain, trunk, or branches of a tree, or the like, the eastern part of the hemisphere would convey sufficient light on the object; granted, if the western superior power be *entirely shut out*. But the smallest admission of the immediate and primitive cause of ALL the light which is in the whole hemisphere, will, in *truth*, render all the opposite lights nothing more than reflection, and the *lights* produced by this reflection, on *even a white object*, must be much darker than the sunset tints in the background.

Some paint a portrait by a light above the angle of 45 degrees, and make some advance towards unity, by giving that sort of colouring to their backgrounds, which the sun, near his setting, may give to the opposite part of the hemisphere: this certainly does suppose the figure and its background to receive their light from the same quarter; but it should be considered still, that the figure will tell you plainly (if well painted) that it received its light from a power 45 degrees above the horizon, when the background will at least “whisper” to the contrary, by the beautiful tints of the sky, as it is certain that the clouds receive no evidence of colour till the sun is much nearer setting than when 45 degrees above the horizon: these jarring conversations in one party cannot be harmonious.

The liberty taken with regard to the *horizontal line* of a picture, is generally the result of ignorance, which I shall endeavour to remove by stating, that whoever takes a portrait *with his eye on a level with the eye of his subject* (which is frequently done), and afterwards paints the *horizontal line* of the picture considerably *lower* than the head *which he had painted* on a level with his own eye (*which must be the horizontal height*), is either a stranger to, or a rebel against, the rules of perspective; and takes a pernicious, because an erroneous licence. If one of the proper uses be made of the *platform and high chair*, which is to *seat* standing whole-length figures on, while painting the *head*, to prevent their fatigue of standing the whole required time: the figure might then be in unison with such geometrical lines of steps, pedestals, etc., as should certainly vanish in the horizontal line. (See Dialogue on the Principles of Perspective, pages 39—42).

Neither can I bring my reasoning power to allow, in painting, light as a *cause*, and its *effect* both in one picture, with the *effect brighter* than the *cause*. I may here commit myself to the severity of all those who take excellence upon trust, and only look for a great name at the corner of a picture, to render candid investigation *almost* a sin: I have before objected, in general terms, to the introduction of any sort of *immediate* light, as a *cause* for any other lights in the same picture. “The flame of a candle, for instance, and the face of an old woman supposed to be lighted by this candle,” in so brilliant a manner, as to give the *flame* the effect of any light-coloured matter, rather than that which is introduced as the *sole cause* of all the light in the picture.

The glittering on water is often painted liable to critical exception, which (at least) requires thought, or the numerous examples of the *fanciful* and undeliberating will infect their numerous successors by pernicious examples, tending to the decline of the arts.

## LETTER XIV.

## BLACKNESS CONSIDERED AS SHADE.

MADAM,

I SHALL now beg your attention to the concluding observations on what belongs to the department of *mere* light and shade, or that which can be effected by black (in various degrees) on white; or black and white, on a middle tint, which, in effect, is the same.

The difference between the imitation of a white statue, and a figure in colours, by the simple materials *black* on *white*, requires the following thought:—The *first* will only have the pure shades and reflections (which are to be considered as the province and limit of the neutral tint): but the drawings which are made to guide engraving after PAINTINGS, must have an additional tint, equal in depth with the various local colours on the subject. It constitutes one great perfection in engraving, when engravers have a just eye to colour, so as to produce accurately that degree of depth which *they* term colour; because it represents the quality of light which is exhibited by the colour on the objects of their imitation; and an admirable effect is produced. This requires nice attention, and great practice in black and white drawings, to accomplish. If you should choose to copy a few *very good* prints (perhaps after Woollett, Strange, and Bartolozzi\*), you will experience a proof of the advantage of comprehending this matter clearly, especially if you can compare them with the original painting.

It may be proper to caution you against too black a manner in shading; weighing the whole subject between the two scales of black and white, although the corners of foreground cannot (in obedience to optical economy) be light (see Letter X., Rule 5), they must never be so dark as to represent black: unless the objects are absolutely so, in their own local colour.

I have observed the works of some artists of acknowledged

\* And now, many other eminent engravers.

merit, wherein the *force* of accidental shade was exhausted at too great a distance from the foreground; the consequence of which is, they are obliged to submit to a pale, tame, and ineffectual force of shades in the foreground; persuading themselves, perhaps (from a misconstruction of an observation by Sir Joshua Reynolds), "that nature, in her vast variety of changes and effects, *might* appear to sanction the circumstance." But light and vision have prescribed laws to the contrary; even partial masses of shade, produced by the interception of *sunshine light*, will not controvert this law as applicable to a whole picture; for it would *unexceptionably* happen, that if your whole scene were composed of colourless objects, the strongest shades would be on the objects nearest the foreground,—and whether coloured or not, the radical law of *light*, and the effects of its *absence*, *must continue the same*, according to the *aspects* of all the various surfaces in the subject.

The *deep* blackness of *clouds* as a set-off to a portrait, *must* be absurd; for were you to add a black hat to the head, you would find a difficulty in procuring a shade strong enough to detach the cloud to its reasonable distance. I have no objection to dark backgrounds to heads, but I think BLACK AIR by DAYLIGHT irreconcilable with reason: if the head must be relieved by sky or clouds, let them be natural, yet fully admitting the light. When a figure is set very high, the head might, and certainly would, fall in contact with a very deep tint of sky, even if painted in the open air: and such a composition should be always painted accordingly. A very simple experiment might ascertain the proper depth of the background, especially if set in the open air, according to the purposed representation, by placing a *black* hat on the head of the subject, and comparing it with the *blackest cloud that daylight* would admit of.

Artists being each engaged in their own undertakings, are not perhaps much acquainted with the various means applied by each other for producing various effects; but a general conclusion may be safely drawn, from seeing seven out of ten *portraits*, with *dark* backgrounds; and I think I may venture to add, five out of ten are *dark skies*. The most probable cause to be assigned for this, seems, the setting the subject promis-

enously down, without considering the great depth of shade that they have opposed their subject to, and without the thought of placing some proper surface up, to qualify such depth, by the reception of a better medium of light; which surface should be as nearly the tint of the proposed background as possible.

Perhaps it may be well to repeat another remark respecting the darkness of objects in the foreground. It seldom happens in the open air, that any of the local colours of nature's productions are entirely black; yet we too often see foregrounds so black, that a painter would find great difficulty in introducing, and properly distinguishing, a *black object* on them: to guard against this error, paint or sketch a black object near the base line, as a kind of key-note, to govern the local colour of other objects, whenever you are studying from idea; but better prove it in nature by experiment.

When you have either black or white to imitate, such as the local colour of drapery, you must consider that *black* drapery has its folds, and, consequently, shades, which can only be produced *with blackness*; you must, therefore, in conformity to the power of light, make the general colour considerably lighter than black, that you may be enabled to make out the forms you wish, by shading with *black*; the natural operation of *light* requires this.

With regard to *white*, if you can have only white for the high lights of white drapery, you must, of course, lower the mass of whatever you would represent white with a neutral clear greyish tint, so as to preserve the whole according to the true effect of white drapery; as then it is in a state to receive those additional shadings, which *model* the form; the points of lace, or the hems of white drapery, and these only when the light is full on them, being all that can admit the touch of pure white.

It will be proper for you to habituate yourself to study after nature, entirely regardless of colour, till you find yourself familiar with the art of drawing, and the integrity of light, *shade*, and reflection; in the practice of which you will never have occasion to deviate from the *principle* of the few rules I



have given you; and that in the strictest acceptation of the term, as the *fruits* of all you do must depend on that general construction of system, which *true genius* only can define by practice.

Often call to mind, and as constantly practise according to the instruction I have given you in my fifth letter, ensuring the *right situation* of everything you would study, or you will waste both time and labour. Consider how mortifying it would be to you, after having taken great pains, and finally succeeded in drawing some *considerable part* of a picture, to find it out of its proper place, or one part disproportionate to another.

Nothing can expose a *portrait-painter* to a more humiliating predicament than to have *incorrectness of drawing* pointed out to him by the critical inspection of his employer and friends, when the picture is finished, and when their remarks point out real errors.

It must be remembered, as your first consideration of colour, that all reflections are of a warmish hue; and all parts which retire obliquely from your eye, and from the light, are of a bluer, or colder hue, than the general shade: a careful attention to this in finishing a drawing from plaster-of-Paris figures, or white marble, will add greatly to the effect—either in chalk, water, or oil; indeed there should be no allowance made for different materials, a *true effect* being always required.

## LETTER XV.

### ON MANNER, FORECAST, AND MEMORY.

MADAM,

I HOPE you are *now well* aware of the necessity of *practice*—the hand must be made familiarly acquainted with the part which a scientific mind will continually require it to act. How painful has it often been to me to see a pencil in the hand of an enlightened amateur, totally incapable of obeying the dictates of refined taste, and first-rate judgment, for want of this. Theory may accomplish the mind, but much

practical application is requisite to make knowledge and practice go hand in hand; for nothing can be produced without the equal union of the mental and mechanical means.

Decide on what is proper to be the subject of your study from the most beautiful and interesting productions of Nature and Art, or, the more accurate the imitation, the greater may be the error as regards the *most valuable* considerations for the best style of choice and treatment; for, an ugly subject or circumstance, if truly imitated, may produce credit to the artist, but the picture must be "*ugly*;" and, although a proper choice be made for the subject of a picture, and perhaps well drawn and grouped, yet if the general effect of light and shade be such (*as a whole*) as to invade the harmony of a *well-toned* eye, the discord must be ugly—however, those who paint for praise may still be gratified. Vulgar approbation is certain to be on the side of *true resemblance*.

But this misapplication of talents should be seriously considered, because *time*, and the honour of the art, are too precious to waste on unworthy subjects.

The antiquarian, and *natural history* painter, cannot be supposed to be subject to this observation.

Acquire a certainty of hand by deliberate attention to the natural but most characteristic properties of each *individual* object: this will prevent that sort of conclusion which is the parent of "*MANNER*." Let every thing that is peculiarly good have its own *peculiarity*, that there may be no *room for yours*, and make it appear that *Nature made the picture*. Take care to use your materials so that the picture may not look *painty*. This will require all your powers, fully disciplined; and be assured, any hasty advance without them, presents no better a figure to my imagination, than a "*blind man running a race*."

A modern writer has said, "There is no great *modern artist* whose pictures exhibit so much incorrectness as Rubens;" and a little after adds, "I do not know any painter who exercises so *lawless* a dominion." It is not my province to enter into all the argument that might arise from such remarks, nor shall I endeavour to turn faults into *comparative* beauties,

by proving that an ill-painted giant would rush upon the imagination with more force than a well-painted cockleshell; because there are some few very rare proofs that there is no allowable apology for an *ill-painted giant*, when *publicly* exhibited as the production of a *master*. It is yet very just to make due allowance for the rudimental essays of the *student* if exhibited *as such*. But I would recommend the writer I have just quoted, and all such as are of his mind on the subject, to recollect LAWRENCE'S "Satan calling up his Legions," and to read Sir Martin Archer Shee's Preface (at least) to his "Rhymes on Art."

Govern your progress, by advancing with collected deliberation, that you may not have occasion to retreat for want of assistance.

The MEMORY is an inexhaustible resource. It may, however, be a fair excuse with some to plead a bad memory; and it would not only be too severe, but untrue, to say all have equal powers to cultivate and improve their natural faculties, so as to become qualified to perform works of distinguished merit. Yet the memory is too often blamed for suffering that to have escaped her, *which in truth she was never properly put in possession of*; and most frequently by a class of impromptu beings who are too often mistaken for *great* geniuses. Admitted—they may be geniuses, but cannot be *great* ones, unless accident happens to awaken them to a conviction of the necessity of acquiring knowledge correspondent with their ambition. And how vainly the idle take shelter under a very pretty conclusion of Pope's, that

"Where beams of warm imagination play,  
The *Memory's* soft figures melt away."

Those who are blessed with clear intellects, and with the virtue of cultivating the knowledge requisite to their particular pursuit, will not have occasion to accuse their memories, but will readily refer to each element (*when once they are known*), as occasion may demand their aid.

Let then the *memory* be well supplied,  
As nought can flow where nothing swells the tide!

There is a degree of impiety in pleading a want of faculties, when the real want is proper industry and method to make right use of them.

The well-received materials most proper for the furniture of the memory, may be compared with the well-disciplined *reserve* of an army, which, although unemployed while the powers appointed are in action, do not retreat or “melt away,” but are ever ready to advance to their object, and are therefore alike unfairly censured as deficient, because unemployed.

Some allow themselves to imagine it good to undertake *great* and difficult works, as *stimulatives* to investigation. I must compare such, to one who jumps into the sea, that he may be under the necessity of trying to swim; or who launches out on a voyage, without the theory of navigation, and the other requisites for such an undertaking.

I knew a country *builder*, who began a house on a considerable scale; and when he was asked his plan of the whole, he answered, “I cannot tell how to settle so much in my mind at once, we shall see how to dispose of matters as we go on.” This may succeed with a certain singularity of genius, but must not be considered a *proper system*.

I have ventured these *trite* comparisons, on points of the *utmost consequence*, with a view to fix them on your memory, by their singularity; for it is the height of absurdity to begin a work unless you know how you should proceed.

Besides the books I have referred you to, for the accomplishment of your mind as a painter, you will find it absolutely necessary to have a good treatise on the Grecian orders of architecture. I think Mr. P. Nicholson’s work, in three vols. 8vo. on this subject, completely adapted to your purpose; and his explanations of the projection of shadows will give you great improvement (*as a painter*), and confirm what you may have found in my treatment of shadows.

Genius cannot supply the want of a competent knowledge of architecture. So far at least should be learnt as to know the just proportions of each order, and their distinguishing properties and qualities, that when either of them becomes the subject of study, a good composition may be *sketched*

without reference to books. Any student resident in London, or other opulent city, might facilitate his accomplishment in this great essential, by ocular demonstration while under a course of architectural study, by viewing the best public edifices attentively, so as to establish in his memory sufficient to enable him to think, speak, and sketch on the subject with consistency.

The Dialogues I have given on Perspective *may* be all you will require on that subject; but should you feel inclination, or occasion, for more examples, Malton (senior)'s is a *complete body* of the science, both in theory and example. Mr. P. Nicholson's (the accomplished author of the *Perspective* already given to the world in two Encyclopedias, and in his own Architectural Dictionary); the *Jesuit's Perspective* and Kerby's Doctor Brook Taylor's are also good, and will not only confirm you in the science, but convince you of the truth of these instructions.

#### HINTS ON COMPOSITION.

P.S. I have found the following rules for designing historic groups to have been of considerable utility. I gave them to a young sketching party, who met alternately at each other's residences, to compose *historical subjects*.

Deliberate on a subject of importance, so as to comprehend the whole composition to a finished effect; that the imagination, or mind's eye, may have determined (in a very considerable degree), on the success of the work, before you begin to sketch the design: and although the first trait of the subject is not required to exhibit that perfection of outline, which *must be found* in every good picture, when finished; I would not be understood to encourage any one, who is not proficient in good drawing, to begin pictures under this licence of the master; because the finishing of such a one's work must be, like the beginning, incorrect.

Let the SKETCH-BOOK *suffice*, AS A tablet of memory, until you have qualified yourself, by sufficient elementary study, for the undertaking. The knowledge of your qualifications will



not remain a secret to you, provided you apply the advice of Pope properly—

“Trust not yourself; but, your defects to know,  
Make use of every friend and every foe.”

Experience has informed me why I advise *young* painters to deliberate *to some decision*, before they begin to sketch the subject—it is this: The minds of those who have not been furnished with an ample stock of knowledge and practice suited to so important an undertaking as the painting a *subject worthily*, are too soon exhausted. The very first essay of the pencil conveys the forms to the corporeal eye, with that sort of self-applause, which too often blinds the critical eye of the mind; and (what “*young hope*,” eager for the end, and too regardless of the *gradual* means, is, in general, too fond of), dismisses that *further* consideration, which might be amply rewarded with success. And when you have determined to sketch a subject, you will find your genius carried on with a degree of certainty, if you arrange the process methodically, as follows:—

*First*,—Consider the place, or scene of the circumstance; whether proper to be composed of landscape, architecture, or any other object suitable to the story; as also, how light may be *obeyed*, to the most picturesque advantage; for it must be *obeyed*; therefore,

*Secondly*,—The climate, season, and time of day, should have due consideration.

*Thirdly*,—The costume of the whole, as strictly as possible, agreeing with the date of the circumstance, in all respects.

*Fourthly*,—The *dramatis personæ*.

*Fifthly*,—Their characters and proper situations with regard to judicious grouping, so as to make the principal appear accidentally, and *naturally* so, rather than designedly, or by palpable contrivance, like a group of comedians in the last scene of a play. Still a *judicious eye* may see *these*, and *much* of the scenery, to some advantage, in the present improving state of the histrionic art, especially by some of the principal characters that now undertake to illustrate the drama; or you may at

least examine all modes of representations,—but nature is the genuine teacher.

*Sixthly*,—Take care to be so well acquainted with the *collateral circumstances*, as to lose none of the advantages which often tend to illustrate a subject; and as frequently serve as very useful machinery in a picture. Hogarth was *master* of this. Do not make an unrequisite use of ornamental drapery.

*Seventhly*,—Truth of design is indispensable; including architecture, perspective, etc. etc.; as strictly so, as the truth of *proportion* and anatomy of the animal part of the work.

*Eighthly*,—Harmony, and TRUTH of light, shade, and reflection, as regards the picturesque, will now require a union of genius and science of the first qualities; because, while the whole must form a good picture, all its parts must be represented with punctual attention to nature, agreeable to the law prescribed by these rules, and by the light under which you may have determined to produce the work.

We shall now ascend to the study of colours; as I hope you feel yourself sufficiently conversant with the *natural, geometrical*, and *perspective appearances of objects*, not only as regards their shape or outline, but also their *shades and reflections* according with the peculiar influence of *the light and distance* in which they present themselves to your eye: which the more you understand, the greater will be your qualification to proceed. But it is neither expected nor required that *an entire* accomplishment in each rudimental department should retard and fetter the lively and eager imagination of genius, as long as the whole proceeds together. Evidences of the *absolute utility of all* must too frequently occur to suffer a judicious student to neglect any.

## THE COMPENDIUM OF COLOURS.



## LETTER XVI.

## ON COLOURS.

MADAM,

THE very word *colours* enlivens one's ideas. All admire the various effects of their beauties; but those who will attempt *to imitate them*, should study the best means to render

such emulation successful; and the following illustrations will prove to your understanding how far *art has succeeded* in bringing the several *coloured materials*, named paints, into a conformity with the science of optics.

The convoluting display which I have given at the head of this letter, was designed—*first*, to evince the *inutility* of recognising any compound below the *third class* of colours: (see fig. 5, plate I., page 208). *Secondly*, as a key to the method of mixing them, for those who may be desirous of an experimental proof of my conclusions: and, *Thirdly* (as I believe the involutions of the line which forms *my* ULTIMATUM to be *entirely new*, both in its formation and purpose, and seeing how seldom *utility* and *novelty* unite together), I considered it worthy of the study to make the design, with an elaborate *increase* of gradations between the nine admitted colours, and their final neutralization by their equilateral union; as *a compendious datum of the system*; and as a figure having some claim to the notice of geometricians, being (like the *Ultimatum*) formed by the involutions of a *single line*:—especially, finding it conformable to the great Leonardo Da Vinci's suggestions, as given in Mr. Rigaud's second edition of Da Vinci's Treatise on Painting, wherein he says—

#### “ON THE MIXTURE OF COLOURS.

“Although the mixture of colours may be extended to an infinite variety, almost impossible to be described, I will not omit touching slightly upon it; setting down at first a certain number of *simple* colours to serve as a foundation, and with each of these mixing one of the others—one with one, then two with two, and three with three; proceeding in this manner to the full mixture of all the colours together. I call those *simple* colours, which cannot be made or supplied by any mixture of other colours.”

The remarks which finish the paragraph, prove that he had not then completed a system on the subject, concluding by saying, “but I shall treat more at length of these mixtures

in a separate work;" but no such work was ever published, nor, (for any thing that appears) ever was written.—*See Rigaud's Note.*

All that can convey the evidence of colour to the sight, is producible by three materials, which are most properly termed THE THREE PRIMITIVE COLOURS: they are—*yellow, red, and blue.*

With regard to the order in which I have named the three primitives, I have conformed to the natural gradations of transient colour, wherein *yellow* is found nearest to LIGHT, *red* the MEDIUM, and *blue* graduating towards DARKNESS.

This absolute triumvirate (which you will find explained by Plate II., "The Painter's Compass," page 212), as appointed by the supreme power of LIGHT, extends its dominions throughout the utmost boundaries of visible matter; each separately governing its own integral province with positive ascendancy; while each to each communicates its influence in perfect concord and harmony, filling the whole region with a succession of beautiful variety conformable to the varying dictates of *light.*

Indefinite as this general description of colours may seem, enough of their constitutions will be shewn by due progression to prove the advantage, as well as the necessity, of that systematic order, in the formation of colours, by which the "woof of Iris" is unrivalled, and the splendid effects of LIGHT rendered imitable in the utmost *possible* degree. And had I not thus fully succeeded in finding a clearer and more explanatory *root* to this branch of science than has yet appeared, I should not have found matter sufficiently important to the arts, to have offered a new simplification of the subject; and that its UTILITY, along with its ORIGINALITY, may be the more readily known, I feel interested in pointing out to you that fair degree of value, which *any improvement* in the branch of art for which it is offered, may entitle it to.

The antique diagram of three united equilateral triangles (fig. 3, Plate I.,) as the basis, or *datum*, of that branch of science which treats on the formation of colours, *by the mixture of paints*, has, hitherto, stood at the head of all the treatises (that I know of) on the subject; perhaps through a due sense



of its purity, or a doubt of the possibility of making any improvement over it without departing from its scientific simplicity. It exhibits the three primitive colours, equilaterally blended where they intersect, forming by their triple union into a fourth or central triangle, an abrupt change from each *parent* colour, to blackness.

Now, inasmuch as this diagram has been considered valuable (and holding fig. 4 as an imperfect contrivance), I presume to claim the same degree of preference over fig. 3, which mathematical science allows to TEN over FOUR—resting this bold but fair claim on fig. 5, in the same Plate, which I have named ULTIMATUM; because it produces and contains *all* the colours that are distinguished by integral names by gradual intersection of every two colours, concentrating finally into colourless compound—as *perfectly*, as scientifically, and with greater purity of formation (being the involution of a *single line*), as the *antique* fig. 3, of only *four* places! The gradual degradation of colour below the *nine of the* ULTIMATUM, is clearly evinced and explained by their compound names in the Compendium at the head of this letter.

Respecting the three materials which are to be used as the three primitive colours, the *most perfect of each* is to be understood, both as to *colour*, as well as *quality*; but as *colour only* is my present theme, I leave the other requisites of the material unnoticed, as I think it preferable to refer to the *full treatise* “on the nature and qualities of the materials in painting” (see Letter XX.) and shall consider YELLOW GAMBOGE, good RED LAKE, and the very best PRUSSIAN BLUE, as fully sufficient to demonstrate the truth of the following—

## AXIOMS.

*First.*—That yellow, red, and blue, are entire colours of themselves, and cannot be produced by the mixture of any other colours.—See plate I., figs. 1, 2, 3, page 208.

*Secondly.*—Yellow, red, and blue, contain the sole properties of producing all other colours whatsoever, as to colour, by mixtures arising entirely among themselves, without the aid of a fourth;—

*Thirdly.*—Because, by mixing proper portions of the three primitives together, *Black* is obtained, providing for every possible degree of shadow.

*Fourthly.*—And every practical degree of *light* is obtained by *diluting* any of the colours, as above producible; or in oil painting, by mixture of *white* paint.

*Fifthly.*—All transient or prismatic effects can be imitated with such coloured materials as are of the three primitive colours, but only in the same degree of comparison as white bears to LIGHT.

*Sixthly.*—There are no other materials, in which colour is found, that are possessed of any of the foregoing perfections.

These AXIOMS form the basis of the following explanations, establishing a simple, clear, and permanent system, according to the nature and powers of the materials.

It is worthy of consideration, that, inasmuch as a gamut is not any distinct tune of itself, so a chromatic display of the formation of colours is not any distinguishable picture; yet so perfectly do each develop that systematical order by which nature has determined harmony, that, without them, painting with regard to colours, as well as music with regard to sounds, would remain to all, as they still do to all those who are unacquainted with them. The student of the following diagrams should consequently wait patiently, and attentively, for the *fruits* which their roots will certainly produce, if duly cultivated.

## LETTER XVII.

## PLATE I.

MADAM,

THIS Plate shows first the *three primitives*, and their six principal descendants, so that they may be understood at sight. These *nine colours* are all that are distinguished by integral names.

## SUBJECT 1.

No.  $\left\{ \begin{array}{l} 1. \text{ Yellow,} \\ 2. \text{ Red,} \\ 3. \text{ Blue,} \end{array} \right\} \begin{array}{l} \textit{The Three} \\ \textit{Primitive} \\ \textit{Colours,} \end{array} \left\{ \begin{array}{l} \text{take the first station as the} \\ \text{sole progenitors of every} \\ \text{tincture that can convey any} \end{array} \right.$

idea of the term colour; beginning their systematical increase according to the evidence of the second row, where yellow and red produce *orange* by simple union; and in like manner yellow and blue produce *green*, and red and blue form *purple*: thus are obtained—

No.  $\left\{ \begin{array}{l} 4. \text{ Orange,} \\ 5. \text{ Green,} \\ 6. \text{ Purple,} \end{array} \right\} \begin{array}{l} \text{These are naturally the first productions} \\ \text{of the } \textit{parent colours}, \text{ taking their proper} \\ \text{stations as exemplified by the third row,} \end{array}$

and are then denominated *colours*, as to every intent and purpose of painting. The fourth row, like the second, shows the means by which the third class of compounds is produced,—

No.  $\left\{ \begin{array}{l} 7. \text{ Olive,} \\ 8. \text{ Brown,} \\ 9. \text{ Slate,} \end{array} \right\} \begin{array}{l} \text{and brought under the denomination of} \\ \textit{colours}, \text{ as practical materials, according} \\ \text{to their stations in the fifth row, com-} \end{array}$

pleting the nine principal materials of the system.

## FIGURE 10. ROOT 1.

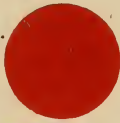
In this diagram (which is *my own*, and which led to my *Ultimatum*), the equilateral intersection of three equal circles

*Subject 1.*

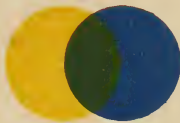
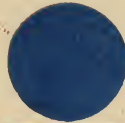
1.



2.



3.



4.



5.



6.



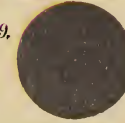
7.



8.



9.



*Subject 2.*

1.



*Root 1.*

*Root 2.*

*Root 3.*

*Fig. 5.*



*Fig. 3.*



*Antique.*

*Fig. 4.*



*Modern.*

*Ultimatum.*

*London. Bayster & Sons.*





forms seven places, and the colouring of each *whole* circle with one of the primitive colours, produces the natural consequence of bringing forth orange, green, and purple, in strict conformity with the general display of them in the upper part of this Plate; and by their mutual union in the centre, produces the same compound of blackness as the antique diagram, fig. 11.

Root 2 (fig. 10), makes orange, green, and purple, its principal colours: as the three primitives were to Root 1, the combinations of Root 2, bring forth olive, brown, and slate: they in due order govern Root 3, whose compounds, as there named, descend as low in the distinguishable variation of colours, as can be rendered useful to the subject.

#### FIGURE 11.

This beautiful union of three equilateral triangles, is well adapted to show the relative balance of the three primitive colours, and the effect of their palpable mixtures by triple union; forming a mathematical evidence of the truth of the third Axiom; the *fourth*, or general *shading material*, being the natural consequence of their intersections.

Of the date of its origin, or of its author, I am not qualified to speak; but believe it to be the most ancient diagram for the purpose to which it is applied, as it perfectly corresponds with the opinion, that the ancient painters produced all their effects of colour by the use of *only four* colours; and, for aught I know, this diagram may be the best authority for such opinion.

Be this as it may, time and experience have proved, that whatsoever colours are capable of, might have been performed with three purely primitive colours, along with their triple or first mutual compound for the purpose of shading; with the use of diluents, in the transparent manner, on a perfectly white ground: but if they painted in *embodied colours*, as oil or distemper painting is at present performed, I would contradict Appelles himself, if he declared that he did not use a *fifth* material, namely, *white paint*. But that the eminent painters of antiquity did perfectly understand the full extent of the powers of the three parent colours, we must not doubt, without concluding that the accounts we have of their marvellous produc-

tions are fabulous. (*See Anecdotes of Ancient Painters.*) Whatever of their excellencies may be lost to the moderns, enough has been restored since Da Vinci gave them his knowledge, and Titian his examples, to render such loss endurable, leaving ancient mysteries to the retired date of antiquity, and the prejudice of curiosity.

## FIGURE 12.

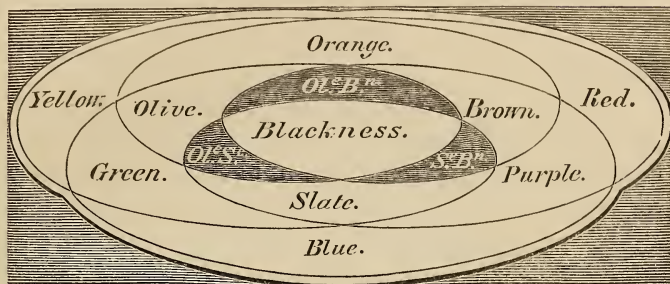
Although I know not the date of this diagram, I have ventured to name it *modern*, because, exhibiting *six* colours, it deviates in its evidence from the doctrine of "the four colours of the ancients," and does not produce the final compound of the three primitives; thus leaving us without any *shading material*; unless the *compound form* of uniting the central triangle to each of the three slips of colour be supposed to have been the intention of its author. But science being always consistent with itself, no imperfect contrivances can be permitted to *stand* as substitutes for simple facts, although they may possess the merit of leading to them.

## FIGURE 13.

## ULTIMATUM.

On this figure, which is the final result as well as basis of the natural multiplication of all the integral colours, I rest my claim to perfect originality and superiority over Fig. 11 (according to my explanation in the prefatory part of Letter XVI.), because there is no other diagram extant, that at one view exhibits the relative origin and natural dependence of every colour on its two primary predecessors; producing them, as it does, by unavoidable necessity, graduating regularly into colourless deep shade, and containing within itself the whole of the chromatic mixtures of Plate I., (excepting the three neutrals which are generated by the third root, which are shewn *blank*

in the diagram below,) as a perfect compendium of the whole system of the descent of *colours* into shade.



147.

Having thus set the basis of a clear system on a **SOLID FOUNDATION**—as far as regards the manner by which colours pass *into* **SHADE**—the three following diagrams (Plate II.) which I have thought proper to name “**THE PAINTER’S COMPASS**,” will explain the order of their expansion towards **LIGHT**, and their mutual dependence on each other for the formation of the various degrees of colour which arise out of their circular communion; while the subdivisional radii will show the gradual ascent of each colour and intermediate compound, into **LIGHT**; evincing by rational inference, the certainty of each being capable of the most subtle gradation; until **LIGHT** would dissolve all perceptibility of colour, according to the whiteness of the *surface* on which they are used, or the material with which they are mixed for the experiment, which must be understood to be the whitest of *white paint*. The principles of colour are the same, and will produce equal effect in *both* the methods of colouring; which may be clearly proved by making a perfect copy of an oil-painting with *water-colours*, or a perfect copy of a water-colour picture with *oil-colours*; both of which can be effected, as far as the tincture, given by *oil* to every colour from white through the whole class of cold colours, will admit of.

## LETTER XVIII.

## PLATE II.

MADAM,

THE three primitive colours here form the central *datum* of the first compass, according with Root 1, Plate I., which is the governing principle; and without which, the *completion* of the compass must depend on the consequence of proceeding, as in Harris's Treatise; while the "*root*," as *here* given, *determines*, and directs, the arrangement of every colour in the circle; leaving nothing to *chance* or "*conventional contrivance*," as each arises in its own and only proper station, dictated by their "*parent root*."

The number of circular divisions may be considered as allusive to *infinite*, by imperceptible gradation between full colour and its total evaporation into light; which I presume is sufficiently intimated by the systematical gradation of three\* distinguishable variations of strength as to colour, as I have offered them in this diagram by the *three* circular spaces.

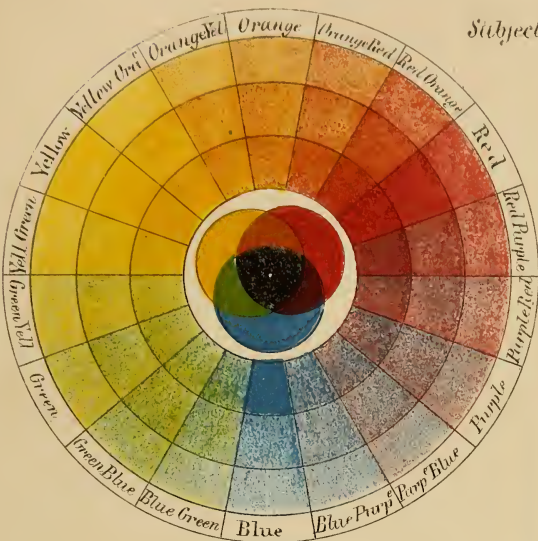
## THE SECOND COMPASS.

According to Root 2, this diagram holds orange, green, and purple, as principal; having olive, brown, and slate, as their natural intermediates. The principles and intention of the three circular gradations, and of the radial divisions, having been already explained, I have here considered one space between each colour, enough to show the systematical order of their circular communion, clearly intimating the

\* It was my first intention to illustrate my proposition by six large coloured plates, until I found that the expence would have been inconveniently high for many of those for whose particular instruction it was designed. I have therefore only *reduced the sizes* of the diagrams so as to comprehend the whole work; and that only (materially) in the compasses, by giving three circular gradations instead of five; but I would advise the *practising* student to *express* the gradations from colour to light by many more circular degrees, increasing the number of radii at pleasure, and on as large a scale as possible, according to my system, which I trust is clearly explained.



# THE PAINTER'S COMPASS

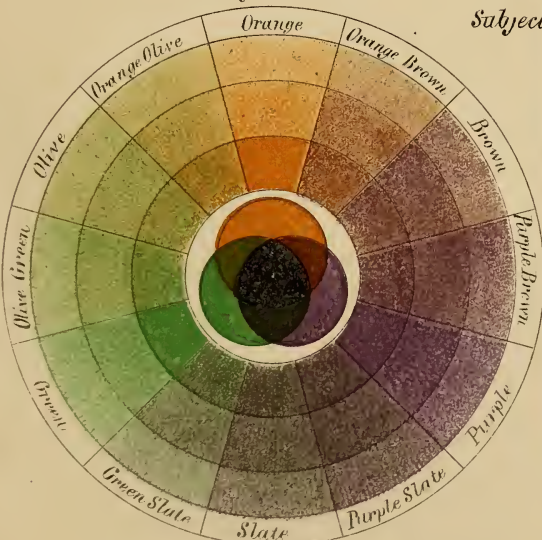


WARM EFFECT.



Expansion of Colours according to Root 1. Subject 2.

According to Root 2



COLD EFFECT.

Subject 5.



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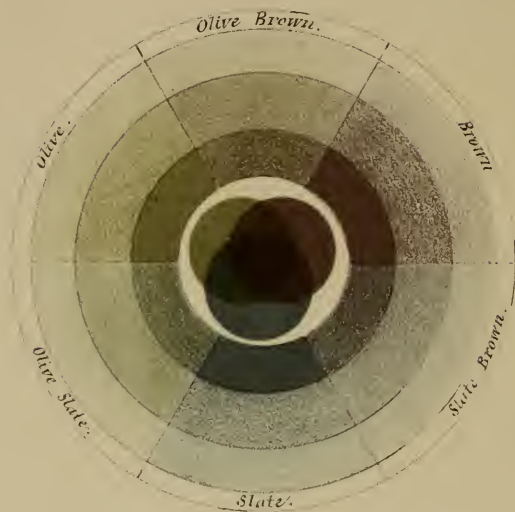






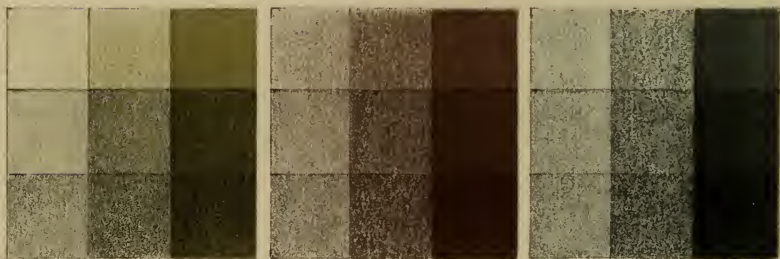
# THE PAINTERS COMPASS.

*The expansion of Colours according  
to Root 3 Subject 2.*



## THE EFFECTS OF SHADOW.

*According to Root 3 ( See Letter XIX )*



*This Plate exhibits the third Root of Plates  
II & III as described in Letters XVIII & XIX.*

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means for more subtle gradations by the preceding compass; as the equal mixture of the colours of any two adjoining subdivisions will produce the colour that should lie between them, excepting the *parent* colours of the compass, which can never be produced by their inferiors.

### THE THIRD COMPASS.

Here, according to Root 3, olive, brown, and slate colours, form the central *datum*, and, like their predecessors, become the chiefs of *their* region. The compounds which are produced by their circular communion, are not sufficiently distinguishable from their humble progenitors, to require, or indeed admit of, more subdivisive radii; nor of descending by any intermediate tint between them and total shade. For were we to make the compounds which are produced by Root 3 between the three colours of this compass, the principals of a *fourth* compass, the whole would blend into indistinct dark neutrality; which, finally united, results in *Blackness*, as already appears in the centres of either root of the compasses. And that nature might dictate the progress of science, and prove it always to be consistent with itself, this final compound becomes a most important material: it is the legitimate *shading colour*, the want of which in Fig. 12, Plate I., is the cause of my excluding it from the system: and *I* consider black to be as deserving the name of colour among colours (*as painting materials*), as any in the system; and to all intents and purposes of painting, as requisite; possessing the properties of infinite variety on the *descent* of colours, as light governs their ascent. The next Plate exhibits the simple effects of its usefulness, by six gradations of shade on each of the nine colours, and is explained in its place.

The rule which Sir Joshua Reynolds has given, in his 41st note on "Du Fresnoy's Art of Painting," is as follows:—"The predominant colours of the picture ought to be of a warm, mellow kind, red or yellow, and no more cold colour should be introduced, than will be just enough to serve as a ground, or foil, to set off and give value to the mellow colours, and should never of itself be principal."

Whether he arrived at this knowledge by a scientific investigation of the operations of light on matter as found in NATURE, or by studying the works of her most successful imitators, is not a subject of my inquiry. HE WAS RIGHT; and I cannot withhold the suggestion, that it surely would have been a weighty confirmation of his conclusions, to have accompanied them with the mathematical demonstration which is conveyed by the natural combination of the three primitive colours in this Plate, as the infallible consequence of their triple union, by shewing their harmony, sympathy, and antipathies, all in incontrovertible order; and although blue has such a powerful influence in its communion with the yellow and red, as to determine the character of “cold” on that *half* of the compass in which it is placed, still the mellifluent influence of yellow into green on one side, and the red into purple on the other, preserves the equilateral balance strictly consonant with Sir Joshua’s annotation.

*Picture, properly so termed*, combines a natural proportion of light, shade, and reflection, on judiciously chosen local colours, which, if properly proportioned in each requisite, and in *natural* order, gives harmony, and conveys so true an effect of the subject, that nature will appear to have adopted the work as her own. None but the genius who is refined by a scientific acquaintance with the system which governs so meritorious a work, can comprehend, nor is even aware of the art required to unite enough of all the component parts for a naturally whole effect; *strictly conformable to the light adopted*.

It should be understood, that nature, in all her formations and effects, exhibits nothing else but *colour*; at least, inasmuch as the effects of light, shade, reflection, and local colours, on the various objects of imitation, are considered; for then *all these* come under the denomination of *colour* or *colouring*, every conceivable and perceivable tint or gradation of which may be obtained by proper application of the means offered by the system comprehended in these explanations, showing the student how to provide proper materials for the possible representation of all effects of colour, governed by the Fifth Axiom (see page 207).





*Subject 1.*



*Subject 2.*



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And, although appearances are rendered such, by that incomprehensible and inimitable power, LIGHT, still, such is its ascendancy over the appearance of all matter in its *extreme* effects, as to annihilate all idea of colour by its overpowering influence; while the *total absence of its power*, is productive of the like effect by the *opposite* extreme, enveloping in *invisible* darkness all that, which, in the vivifying *medium* of LIGHT, diversifies a scene with all the variety and beauty that colours *can* display.

## LETTER XIX.

## PLATE III.

MADAM,

FIGURE 1 of this Plate will show you how three degrees of each of the nine colours of the system, would be affected by *various degrees of shade*;—expressing the simple effect of the absence of light, and proving that the increase of shade, unaffected by reflections, does not increase the *local* colour. In these examples, the three top spaces of each are to be *pure colour*, of three different degrees of strength, which are each to be carried down without alteration of colour through the two rows below; *the whole variety of appearance* being obtained by the different degrees of darkness, as printed on the Plate.

If you colour a circle according to the example in the diagram Plate III., and contrive to fix it on the top of a whipping-top, or any thing that will give it very rapid motion on its centre, the effect will be white: this *impalpable* mixture of the three primitive colours, is one of the proofs of their peculiar powers. (*See the Axioms*, page 207).

According to the proposition on which I have herein offered a rudimental system, I consider the NINE colours, and their *final compound*, in comparison with the NINE fundamental characters and the *cipher*, in arithmetic; each being fully competent to the almost infinite purposes required within their

systems: because, whatever is *calculable* within the powers of the *nine figures* and the *cipher*; so whatever is *imitable* by colour is within the powers of the *nine material colours* and their *united compound*; and as the knowledge of arithmetic must precede the study of calculation, I have thought it equally reasonable to make the *knowledge of colours as painting material*, precede the study of their applications.

## LETTER XX.

### PLATE IV.

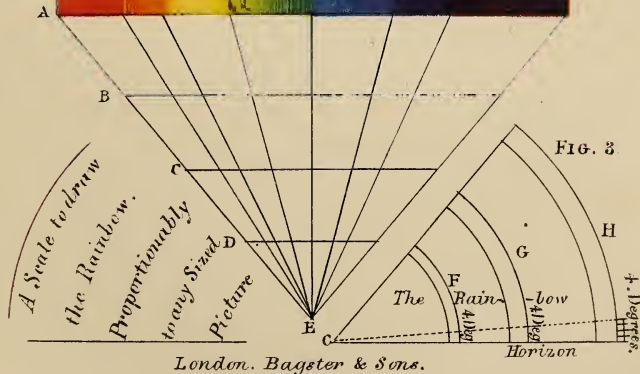
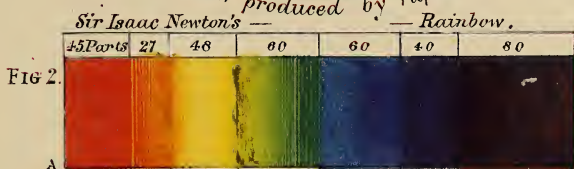
MADAM,

ALTHOUGH my FIRST *proposition* exonerates me from assuming any explanations which properly belong to the practice of *transient* colouring, I have confidently taken the subdivisions and colours of the *rainbow* for granted, according to Sir Isaac Newton's distribution of them, as in the whole above A, in Fig. 2, qualified by the *fifth* Axiom; which may induce you to make yourself more particularly acquainted with that beautiful phenomenon; which is never visible when *the sun's height is above* forty degrees. It ought to be mathematically understood by artists, that the rainbow can only appear to be nearly *half a circle*, at the instant of sun-setting, and that at all other times of the bow's appearance it will be elliptical, with its longest diameter parallel to the horizon; most so, when the sun is farthest from the horizon: to be geometrically ascertained, by finding how far below the horizon the centre of the bow is when seen, which is the same number of degrees as the sun is above it; thus, as it were, throwing the bow back from the perpendicular.

The example given (Fig. 2, above the line A,) proposes to show, that in the space appointed for *red*, all that can come properly under that denomination, must graduate from *deep crimson* to the deepest tint of *orange*: then carry off the *orange* colour till it meets the deepest tint of *yellow*, with which it must unite imperceptibly; then soften off the *yellow* till it meets and unites with the *palest* tint of *green*. At *this point* of the

# THE RAINBOW.

FIG. 1.



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bow, colour is scarcely perceivable, through the delicate light which must there be affected: the *green* must tenderly increase in colour and *blueness* (but not *blue*), till it finishes at the palest tint of *blue*. *Blue* will go on in the same way increasing in colour to *Indigo*, and from that to the *violet*, uniting with it, and finishing *violet* with the deepest of that colour.

The *width* of the bow, see Fig. 3, is governed by the arch it forms, being somewhat less in width than four degrees of its arch. The distance of the second bow, above the principal or *rainbow*, is not quite nine degrees, and the colours are reverse of those in the first bow; this is not intimated in the *diagram*.

The converging scale of Fig. 2, from A down to E, will direct to the drawing of a rainbow proportionable to any size landscape. First mark on the edge of a card the width of your intended bow; then apply it, parallel to the line A, to that part of the scale that tallies with the length of your measure, as at A, B, C, or D, or any intermediate space between those given measures; and mark on the card all the intermediate divisions of the colours. Should a wider bow be required than the measure at A, continue the divisional line that diverges from E *upwards*, to obtain any width required; then apply your marked card to the foot of the proposed bow in your picture, and set off the marks carefully.

#### TO PRODUCE AN ARTIFICIAL RAINBOW.

##### FIGURE I. PLATE IV.

This figure proves the super-eminent powers of the three primitive colours, by the experiment proposed by it, which, for *this example*, being confined to the size of the Plate, cannot strictly correspond with the proportions taught by Fig. 3 (that of making the width of the rainbow about four degrees of its arch); because a *whole* circle is here required, that a sufficient breadth of each colour may be displayed to illustrate the experiment: it is therefore full forty degrees from the inner to the outer circles of this example, to bring it within compass; but the *three colours* will nevertheless blend to the perfect elucidation of the problem, by observing the rule which its figure

directs. First, draw the largest circle that your tablet will take, and a smaller one within it: the space within these two circles is to exhibit the width and colours of the rainbow, by rapid circular motion, when the *three colours* are properly disposed on it, which, by practical application to your scale in Fig. 2, and its explanation, you will subdivide proportionably, and strike circles at each subdivision, as at 1, 2, 3, 4, 5, 6: then repeat the lines of the radius by any smaller number than the twenty-four equal parts of the circle in this example, and then draw the zigzag lines all round, according to the example. Colour each partition which they form with *an even lay* of the colour, filling the *outermost* partitions with *red*, and the whole space all round that lies between the red; and the next zig-zag boundary line is to be one uniform *yellow*,—the next quite home to the inner circle, and from the inner line of yellow, is to be an even lay of *blue* all round—then colour the remaining narrow parts home to the inner circle with *red*. The whole should be drawn with soft pencil, that all the lines may be rubbed out after it is coloured; then cut all the extra paper away from the painting, and paste it (the bow) on a neutral grey paste-board, leaving it larger than the bow, and make the experiment proposed, that of putting it into rapid circular motion, according to your own ingenuity and convenience.

There has appeared to me, sometimes (perhaps by illusion, or pressure on the retina), a beautiful gradation of arches under the true bow, with a tender repetition of its colours, retiring in perspective like several bows one beyond the other, exciting the idea of an architectural interior.

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#### LAWS OF LIGHT, SHADOW, AND REFLECTIONS.

The following practical rules may serve the student of *transient* effects as a *bunch of keys*, with which he may obtain admission into the principal paths that *lead the way* towards the successful application of the colours found.

1. Reflecting surfaces tincture the objects reflected on with their colour, proportionately with their distance from each other,

the angle under which light operates, and the textures of both surfaces.

2. The general prevailing colour of light tinctures every object within its influence: for instance, observe the whole hemisphere at clear mid-day, or the time of a warm sun-setting, or the grey effects of a cloudy sky, or a fog.

3. The power of light, particularly sunshine, increases the warmth, and weakens the local colours, of all the cold class of colours, which are *blue*, *green*, and *purple*; for instance, grass, which in shade appears a cool refreshing *green*, will appear almost *yellow* in sunshine.

4. The *warmth* of parts, or breadths, which lie under a partial degree of shade, but where the power of lights from surrounding matter prevails, is accounted for by the quantity of such secondary light, and their local colours.

5. When a white surface *reflects* on the *shadowy* part of any colour, it looks *paler* than the *lighted* parts of such colour; but the power of the shadow holds it inferior with regard to light.

6. Glossy surfaces receive the form and colour of all objects locally, according to their purity, and reflect them accordingly, being in such degree mirrors.

7. Every colour that is reflected on by its own colour, is enriched thereby; according to the strength of light on the reflector.

8. Every colour that is reflected on by its directly opposite colour, will be neutralized thereby; such as, *green* against *red*, *blue* against *orange*, or *purple* against *yellow*, in an equivalent degree with the power of light.

9. If any two approximate colours reflect the one on the other, its tincture will approach the appearance of that compound which the two colours would make by mixing them (see Painter's Compass, Plate II.).

10. The direct opposite to any one of the primitive colours, is an equal compound of the other two.

11. The middle colour, or medium, in a warm effect, is *red* (see Plate II.).

12. The middle colour, or medium, between light and darkness in the gradations of a cold effect, is *green* (see Plate II.).

13. Whatever be the colour of a flat surface when viewed directly perpendicular by the visual ray, and fairly lit, must be painted of that colour, when unaffected by glittering or reflection, regarding duly the influence of distance and aerial medium.

14. The *certain colours* of all visible matter must give place to their *appearances*, owing to the compounding influence of *light, shade, reflection, various distance, clearness, density*, and prevailing hue or colour of the medium under which *any colour* is seen.

15. Every gradation of shade is a gradation from the purity of colour, because of the prevailing power of darkness over the evidence of colour.

By the *foregoing* explanations, it is to be hoped that the student of *colours* will find such *leading rudiments* as must be considered essential materials for entering on the study of so subtle, so sublime, and important an ART as that of PAINTING; and, I trust, will feel the advantage of my humble endeavours, in having disengaged the ART OF MIXING COLOURS from that *of using* them, *which* must depend on a knowledge of the SCIENCE OF TRANSIENT COLOURS; the study of which I most earnestly recommend to every one who presumes to attempt imitating the various effects of NATURE according to the unerring, yet ever-varying decrees of LIGHT. And I have cause to believe, that the investigation necessary to insure a familiar acquaintance with the *beautiful iris*, will be found to be a very instructive introduction to the study of all other effects producible by COLOURS.

It now, surely, appears reasonable to conclude, that those who use colours without a scientific conformity to, or even apprehension of, a *system*, must depend solely on harmony of sight; knowing and feeling when they are right, but unacquainted with that which would ensure them against the *risk* of the contrary, and that waste of time which must occur on every new experiment.

It may be asked, if such is the extensive power of THREE COLOURS only, why are we furnished with such a great variety of paints? The answer to this question, satisfactorily, would give the inquirer some considerable study. There are books



which explain the nature of *substances used in painting*, to be obtained by application to a bookseller.

It may suffice if I give the general information on the subject as a general answer.

The three substances (except ultramarine) which produce the primitive colours, and mix so variously to all tints whatsoever, are not so strong and durable (when mixed), as many natural and artificial productions of different colours; these, therefore, are preferred both as to their strength, and as they save the trouble of compounding. Another great reason is, the inferior colours are cheaper than the primitive.

It will be worth the study, if you inquire attentively into the nature of your materials, by the means above referred to, or as much deeper into the art of chemistry as may suit your taste for such study; as the compass of my undertaking will not admit of room to launch into all the information necessary for an accomplished artist. Besides, where a book is already extant, *equal to the purpose*, I fulfil my engagement by directing you *how to obtain it*; for it would require a complete Encyclopedia of Art, to bring all that is requisite on the subject into one book.

## LETTER XXI.

### SOME CONSIDERATIONS ON COLOURING THE DIAGRAMS.

MADAM,

As you are desirous of attaining a practical knowledge of the foregoing system, *you should draw the diagrams larger, and colour them* with studious attention; and notwithstanding my confidence in having explained the whole to a common capacity, I should be wanting in candour to you as a student of colours, were I to hold out the delusion—that to read it and understand it, would be sufficient, except you aspire only to the accomplishment of an amateur.

The landscape painter in water-colours, who is not properly accomplished in determining on the direct means of producing any particular effect, will be richly rewarded for his labour, by

colouring the whole of this system according to the colours named in each part of every diagram, in the progressive order of their development; whereby he will ascertain the invariable relationship of the gradations suited to circumstances; along with the simple and certain art of producing any tint or colour he may require.

*Practice* is one of the great means of perfection; for when we find ourselves earnestly engaged in the *performance* of a work, the faculties are awakened to all that appertains to it: thoughts and conclusions arise, which perhaps would never have occurred; some of which may lead on to others of infinite value to the object of study. It will instantly appear, that the following directions are for such as are unaware of mathematical demonstrations on this subject, which is *evidently* the case with many great geniuses—decidedly so with all *mannerists*, who accidentally hit on a method of giving one tolerable effect, and then abide by it, to save *self-examination*.

But as there are few of *that class* who will be anything the better for *general* instruction, I will not invade their egotistical felicity, but proceed with my instructions to more *pliant spirits*, who will find it most advisable to learn, from the proposed *practical* study of the diagrams, all that they teach, *before* or along with the philosophy of Optics. This should be attained by the aid and instruction of *proper* authors (if not *masters*), to prevent the mortification of that vanity of self-applause, which may rack the brains of would be “*original discoverers*” with dreams of great outdoings, for want of *a little humble and judicious reading*, when they would find that Newton, etc. etc., had completely insured the prize for which they had so fondly and so vainly laboured.

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#### COLOURING OF THE DIAGRAMS.

The Three Primitive Colours determine for themselves, being each of their proper colour without any mixture. But as they may be varied in the *depth* of their colours, according to the quantity used on a given space, you must take care to avoid both paleness and darkness, so as to satisfy your eye that each

is perfectly the colour it is named to be. YELLOW must be neither more nor less than perfectly yellow; which, in using gamboge, will require care, because its *full depth* tends to orange colour; and wherever it is to mix with any other colour, it is advisable to use it *alone*, by laying it on the colour you would mix with it, as it is rather an unsociable material, and acts best *by itself*; but *some* mixture of it with other colours is unavoidable.

The red lake requires enough of yellowness to be added to overcome its pink effect, so as to produce a *scarlet* tint, which is the *true red*; and its *proper depth* of colour must be feelingly attended to; and so of all colours, when considered as the standard colour of its name, which is when they are the true medium between the lightest and darkest tint of each colour.

The *proper depth* of the Prussian blue is all the attention the BLUE requires: thus you are provided with the first three colours of Plate I., which are there, to be used invariably of the same depth, as also throughout the work, wherever they are named independently of gradations.

The second row of Figure 1, Plate I., is the clearest and most simple evidence of the means by which the third row (or second of colours) is produced that I could devise—the intersections by couplets bringing orange, green, and purple, in their proper colours, *as they are to be* in their respective places of the system, forming the second class of colours as they stand in the third row. Although each of *these* are made by mixture of other colours, they must be so perfectly balanced by the eye, as to produce no idea of either of the two colours by which they are made. So that green, orange, and purple, must appear so entirely independent of those which produced them, that yellowness, redness, and blueness, must no more be excited by them, than they were before you knew the mechanical origin of these compounds. The couplets which are to be formed by them, according to the fourth row, produce by simple intersection the *third class of colours*, as they are set up in the *fifth* row, and are olive, brown, and slate colours. Here we have the *nine rudimental* materials for painting, or colouring, NOT ONLY THESE RUDIMENTAL LESSONS, BUT THEY ARE

THE MOST AMPLE MATERIALS FOR THE GENERAL PURPOSES OF THE PALETTE; their truth and utility depends on your keeping strictly to the colours, both in *tincture* and *depth*.

The second subject of Plate I. will only require the nicest observation of the foregoing directions, with regard to each colour, both in *tincture* and *depth*. The same is all that need be said of colouring Figs. 3, 4, and 5.

Plate II. The *centres* of the three compasses are repetitions of Fig. 10, Plate I, and are named *roots*, from their situations and offices, and must be coloured *exactly* to the originals (as it is from these that the inner spaces of the circles are to be coloured), and *most carefully matched*. Then, as the first compass contains eighteen radial divisions, and the *root* dictates only six of the colours, there will consequently be two radii between each to be coloured by the harmonising communion of the two colours which such spaces lie between; i.e., the two spaces between yellow and orange must graduate out of one into the other, by just proportions of each, according to their local influence:—the same between orange and red, and from red to purple; then on to blue, which will graduate towards and into green, as the green must up to the yellow. This will fill the inner circle scientifically true, and each of the outer circles will be only the one paler than the other by three distinct gradations, from full colour in the inner circle to pale on the outer circle of each example. A good way of proceeding will be to mix all the colours to the palest tint, colouring each whole ray (all three divisions) at once: then leave the outer space, and repeat the colours again on the remaining two radii to the proper depth; when you will only have the inner circle to repeat the same colour on to a *full depth*, which, if well calculated, will finish the compass. The more care you take in preparing the original colours, the easier will the work be.

The second compass leaves but one clear space between the six colours dictated by its central *root*: those spaces must be coloured by an equal mixture of the two colours which lie on each side of it, so as to make a harmonious association with both.—The third compass having but six radii, the colours are all dictated by its central *root*. Subjects 4 and 5 must

be worked according to the manner of the directions given for colouring the rainbow, page 216; and the directions for colouring Fig. 1, Plate III., are given under the proper head, in Letter XIX.

The centres of each of the three roots, Plate I., Fig. 2, will be equally of one tincture; that of colourless shade, nearly black, notwithstanding the various colours of their causes:—and it will be one test of the truth of the colours of their compound causes, namely, the three colours which, by inter-sectional mixture, form each of the centres.

## LETTER XXII.

### INTRODUCTORY CONSIDERATIONS ON COLOURING LANDSCAPES.

MADAM,

THEORY can only shew the ENTRANCE to that vast and varied field of the art which comes under the dominion of colour; or perhaps point out some few of the main roads which are most likely to forward the student on his way towards the attainment of a rational system.

To paint in water-colours, you must begin by shading, or (in effect) modelling\* the whole with a *neutral tint*, composed of indigo and Indian red, which produce a charming cool retiring colour; more generally adapted to receive the various appearances of local colours than any other, particularly in landscape.

Whatever you can conceive to be, in any degree, shadow, may be done with this tint, not regarding the colour of the object, and using this neutral tint only, as the proper *representative* of shade; which, you understand, means all the various degrees of the absence of light, independent of the additional force or depth which the local colour must give

\* Which, I presume, you now understand to be the producing an appearance of the *substances*, supposing your whole subject to be composed of *white objects*, entirely disregarding colours; you will not lose time if you re-peruse Letters X., XI., and XII.



when added. This will be sufficient caution to you against doing too much of the picture with this tint; for, when the effect of a colourless object is produced, with all its proper force of light and shade (such as a finished white marble statue, or any other *white* object), this neutral tint has completed its part; except as a *local tint*, it may often suit the colour as well as the form; as in clouds, water, and distance, (in cloudy scenes) which makes it superior to Indian ink for the purpose of dead colouring, as this first lay may be termed. Observe, all the *transparent* colours, in some instances, shade themselves.

The method of preparing and using this neutral tint is precisely according to the direction given you for shading with Indian ink (see Letter X.), calculating on a sufficient quantity of each degree to be mixed in separate saucers, before you begin to colour.

Now, as the instruction for adding the true effects of the various colours of each object in the picture, and also the general hue or tone of it, must depend on circumstances, I can only proceed to give general information, which, if properly digested by practice and observation, will, I hope, introduce you to a good system of reflection, and lead you towards a true imitation of nature.

The first general distinction of colours, is by dividing the circular diagram (*Painter's Compass*, as explained in the XVIIIth letter, Plate II.) into two equal parts, horizontally. And you will find all the *warm* colours on the red and yellow half of the *Compass*, and the *cold* on the other, through the influence of *yellow* and *red* on the one half, and the power of *blue* on the other.

The warm colours are adapted to advance, and the cold are considered as retiring colours, when viewed with the light; yet they all will suit a forward position, when pure, and properly supported (according to the illustration of the above diagram); but will retire in *various* degrees towards the distant ground, when used pale on the neutral tint, suited to the intended distance; and (in *oil*), by mixing white and neutral enough to carry the colour off. This will be confined to flat

surfaces only, in a due degree of light, without glittering or reflection;—producing this general rule,—That the greatest warmth will always be found on the illuminated side of the object; and, as far as a general rule can accompany genius, in views of natural scenery, you will find that, when looking *towards the light* (as for instance, a SUN-SETTING effect), the distance and sky will possess most of the gaiety and warmth of your palette, with all the *light* possible; and the foreground will be cool and sedate, and advance with increase of shade, owing to the shady side of all objects being towards you; and in all broad masses, which lie entirely out of the immediate influence of the principal light, this will be *strictly* the case on account of their sole dependence on the cool, secondary light of the opposite part of the hemisphere, excepting from *local* reflections; blades of grass, and leaves of some trees, being transparent, must be treated accordingly. See Letter X., Rule 12.

It will be impossible to tell you what gradation of tints will best accomplish sun-setting effects; they must be *seen* and seized at the *instant*, owing to the rapid changes of the cause: the whole effect will change gradually, so that it is impossible to copy it on the spot. *This it is* which renders a *previous scientific knowledge* of the varying degrees of light, and its effects on various scenes necessary: for *yellow* changes quickly to *orange*, and will become *pink*; and then *purple*, in a short space of time deepening into indigo, on to the total absence of all idea of colour. This gradation will be found on the *edges of clouds*, according to their apparent distance from, and strength of the CAUSE of the light on them; and the plain atmosphere, or *space* seen behind such clouds, will graduate from colourless brightness near the horizon, to yellow, then pale green, on to blue, till it falls in with the indigo; and, like the gradation just mentioned, will at last retire upwards into colourless shade, as night advances. So that the mass of *space*, or *plain sky*, will derive its colours and gradations of them, from the horizon to the zenith, according to the arrangement found in the *blue* (or cold) *half* of the rainbow; and the *clouds* will be illuminated with the colours of the (warm or)

*red* half, including half the centre, or yellow portion in both instances; beginning with the lightest yellow possible on the horizon, and ascending gradually to the deepest colour of *each* extreme of the bow: the *one* for sky, the other clouds, as follows:—

<i>Purple,</i>   <i>Red,</i>   <i>Orange,</i>   <i>Yellow,</i>   <i>Green,</i>   <i>Blue,</i>   <i>Indigo.</i>	
Colours of the lighted parts of clouds, as correspondent with the <i>warm</i> half of the bow.	Gradation of the colours on the space or clear atmosphere, the <i>cool</i> half of the bow.

#### A SUN-SETTING EFFECT.

##### *Zenith, or Top of the Picture.*

Colours of the lights on the undermost edges of clouds, as correspondent with the warm half of the iris.	Purple,	Indigo,	Gradations of the colour of the sky, as correspondent with the cold half of the iris.
	Red,	Blue,	
	Orange,	Green,	
	Yellow.	Yellow.	

##### *Horizon.*

Let it be recollected, that this systematic association of colours, can only be found under *one particular circumstance of light and ærial medium combined*; and is given as a theme of study in the department of rudimental research, under the full conviction, that the more *causes* can be ascertained by such as are possessed of adequate talent, the more freely and powerfully will their effects be displayed.

I shall, therefore, advance some further observations on systematic effects of light, aspect, and consequent colour, as they appear to rest on any practical basis; from which genius may take flight upwards with some increase of certainty, that there is a way *towards* the radiant realms of perfection, without "*groping through chaos.*"

Permit me now to call your attention to the effect which would present itself to your study, by turning your back to-

wards the western horizon, when the sun is in that part of the sky. You will then find the greatest distance to be the coolest, and every object will brighten as they approach the foreground, and will have their local colours heightened by the power of the light directly on them; exhibiting all the spirit and warmth of colour, as well as strength of shade, on the nearest objects, according strictly with the rule just before given. You must recollect what has been said on the subject of *light*, *shade*, and *reflection*, as they are *general rules*, and must bear their parts as much in a painting as in a mere drawing without colour. They are the keys to Titian's *cabinet*. You must also conclude it reasonable, and will prove it in nature, that as the two contrary effects I have noticed, arise from a direct contrariety of cause, namely, the *warmest* and the *coldest* light possible in one hemisphere, any view, therefore, to the right or left of either the one or the other, will have their warm and bright parts towards *the light*, and the *shades*, in quantity and tone, will be proportionate to the degrees of *its absence*, and the angle under which they are viewed and lighted.

With regard to the particular colours proper to each part of your scene under those aspects, the circumstances *alone* can dictate: if the objects are free from moisture, you will have much more of their local colour than when wet with dew or rain, because moisture gives a glassy surface, which returns reflections of the sky, etc. to your eye, instead of the colour of the object. Let it be strictly observed, that experimental evidence of what the certain or general colour of any object *is*—must have no influence over the *painter's* eye, no more than *absolute forms* have over their *perspective* appearances; he must resign all previous acquaintance with the colours of objects, especially distant ones, and *confine himself purely to optical conviction*, which is *aërial perspective*, or the perspective of colours, and endeavour, by scientific inquiry, to discover *why* the known colour of an object must give place (in painting) to its apparent one—so as to enable himself faithfully to anticipate the principles of those natural effects which *LIGHT*, in its various degrees, produces on the vast and wonderful variety of objects, surfaces, textures, and distances, which present themselves, *each*

in as great a variety of appearances as there may be changes of position, and degrees of light—that (like the accomplished scholar) he may be thoroughly acquainted with the grammar and dictionary of the language in which he undertakes to communicate his ideas; for it is on the utility of learning and elementary knowledge that genius must still *chiefly* depend for the successful results of his labours.

\* “ All substantial bodies resign their local appearances according to the proportion of their distance; and their evidences of unevenness soften, through the perspective diminution of the parts, into *apparent smoothness*, and consequent glossiness on their *light sides*; until, finally, in the extreme distance, a mountain would assume the apparent substance of a cloud, as well as its colour, according to the degree of glossiness on its surface: which glossiness is not solely to be attributed to the smoothness and moisture of the snow as found on the continental mountains, but to that effect of smoothness which is produced by *distance*; becoming thereby an effectual mirror, and conveying the colour of the sky, or clouds, to the eye of a spectator by *reflection*.” (The softening effect, produced by density of atmosphere, must be considered according to its degree, *along with*, and not *in opposition to*, this radical cause of distant colours.)

According to the above conclusion, the extreme blueness, and various other aërial effects of colour on the distant mountains seen on the continent, may be clearly accounted for. *Suppose the general slope of the side of a mountain lay at an angle of 45 degrees from the level* (fig. 148), the spectator of this would find it reflected on by that colour which would be in the sky or clouds perpendicularly over it, at a right angle to his visual ray; and the same sort of calculation will in all cases confirm the conclusion (see Dialogue on Reflection); the whole effect heightened, of course, according to the general moisture of surface. Therefore, in an effect looking towards sun-setting with a *wet* landscape, you will find the colours of the sky reflected strongly on the various distances, according with the angle under which they come. The most distant would in

\* Extract of a letter to my eldest son, during his first journey to Rome.





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some certain medium of atmospheric matter almost assume the colours of the sky nearest the horizon; and as your eye would advance nearer objects to your attention, the reflection of clouds or sky, at an equal angle with that which your ray of sight would make on the surface of them, would give *their* colour instead of the local, and consequently would increase in depth of cool shadows, still preserving the evidence of local colours, and effects of transparent bodies, until arriving at the base line of the picture; the absolute glitterings of wet excepted.

The effect you would have, when viewing the opposite aspect, under the same circumstances of wetness, would (as I have observed) render the distance much lighter than in a dry landscape; which I conclude is owing to the power of light returned by glittering: and although the colouring would advance towards the foreground, with a due degree of general warmth and increase of local discrimination, yet the moisture would have that general cooling influence which the incidental clouds would convey at their proper angle of reflection; producing that mysterious play of various tints over the whole scene, which none can attempt without scientific experience after nature; and in imitating which, even the copyist of a good picture of this description can seldom avoid *gaudiness*.

It is almost impossible to carry instruction beyond the basis laid down by these suggestions, without a risk of confining a *diffident* student too much within system; but as some *general instances* may awaken the right mode of application, I shall advance them thus:—

Either of the three principal colours will *stand forward* in a picture, by being opposed with compounds of the *other two*, agreeably to the order they are found in Plate I. figs. 11, 12, and 13; and consonant with the *tenth article* of the laws for light, shade, and reflection, page 219, and when either *black* or *white* is required to form the *principal mass* in a picture (such as the black or white drapery of a single figure), they may be supported or held conspicuous, by subordinate masses of all the three colours, ingeniously and naturally arranged;—either pure and separate, or compounded, agreeably to the light, shade, reflection, and distance, of the objects on which they may be adopted. And as another *eminent example*, suppose you have occasion to paint a group of figures all uniformly dressed in white, or pale buff colour (as in the picture of St. Romaldo, of Andrea Sacchi),—*say quite white*:—The greatest success of such a picture must rest on judicious composition, character, and disposition of figures and draperies, so as to secure an agreeable balance of light, shade, and reflection, *chiefly*, of course, with proper expression of the subject. The next consideration must be upon that scientific balance of colouring, which would produce a natural and harmonious picture, according with the natural powers and properties of the three colours. Thus, in the example quoted, white, which is the *absence* of the three primitive colours (when considered palpable), being the object of *fore-standing* or *principal*, will be successfully brought forward by the *presence* of the three *primitive* colours, *judiciously* harmonised by light and shade.

It is a common question with amateurs, to ask what colour is proper for the shading of another. The plain and direct answer to such inquiry, is—*no colour*: for *shadow*, in its *greatest* degree, is entire *darkness*; and every gradation of *colour* out of darkness towards light, will in the same degree regain its original hue; which effect may be very fairly proved only by

colouring on Indian ink shading; when the mere light and shadow of an uneven surface (*of any colour*) is considered. But when shadows are reflected on by any strong colour, the simplicity of the shadow is overpowered by such reflection, and must be treated accordingly; for instance—the reflection and counter-reflection of red rose-leaves, when full blown, continues and contains the colour, even in deep shades, to a greater degree than the radical principle just advanced would seem to allow, which is owing to their “transparency.”—See my Xth Letter, Rule 11.—Paint some plain stripes of various colours on a slip of drawing paper, leaving some uncoloured space between each, and you will find, by bending or rumpling the paper, that the shade produced by the bending is NO colour, but precisely the *same tincture of shadow* on the *coloured parts* as on the *plain*, for colour (truly so called) is *never increased* by shadow.

The remarks I have made are rather to lead you into a proper train of observation when studying nature, than a presumption to give a law for colouring without. To become an accomplished imitator of the beauty and harmony of the natural effects of colour, you will find it proper to apply, *frequently* and *studiously*, to every picturesque circumstance which may tend to the improvement of your powers, seizing *whole* effects, practically from nature; and subdividing your masses into as few gradations as possible, when COLOUR is the main object of inquiry. The various *seasons of the year, and times of the day—the storm, and calm*—all have their characteristic beauties and peculiarities, of equal importance in the choice of a subject.\*

Those who make landscape the *chief* object of their study, would find great advantage in getting correct outlines drawn of the most picturesque subjects that offer themselves to their *frequent* observation; these should be in their *pocket* sketch-book, and such artists should never be without the *pocket*

\* Howard on Clouds, is an ingenious and very useful book to landscape painters, but more particularly as to the skies of historical pictures; because artists, professedly in this department, may not have drawn these general conclusions from nature, which are indispensably necessary to the unity of circumstantial history.

*water-colour box*, etc.; then, when any interesting effect of colouring happened to occur opportunely on revisiting any scene which had been previously *outlined*, they would be prepared to arrange the various tints on the outline, without loss of that *very precious time* which the study of aërial colour offers, and on which a *whole picture* most materially depends for that unity of effect, which no theory can explain, beyond the general scientific principles that evince the correspondence between causes and their effects, enabling the artist to be his own interpreter. I cannot finish this letter without calling your attention to two writing-copies, which I have remembered ever since I wrote them at school—

“OPPORTUNITY LOST CAN NEVER BE RECALLED;”

and,

“He that defers a thing from day to day,  
Doth on a river’s bank expectant stay,  
’Till that full stream which stops him shall be gone,  
Which runs, and still *for ever* will run on.”

### LETTER XXIII.

ON OUTLINE, PROFILE, AND THE PAINTING-ROOM.

MADAM,

I HAVE hitherto treated of drawing (or outline), light, shade, reflection, and colour, *separately*, for the sake of progression, that you may be the better enabled to collect the whole under one idea—*that of a complete picture*.

The *outside line*, correctly understood, is a most important preliminary to accomplish: while light, shade, and reflection, are only the general continuation of it.

What the *outside line* is to the apparent extreme edge of the object, lights and shades are to all the parts which lie between them; evincing, by their differently arranged degrees of force or tenderness, all the projections or recedings, as perfectly as the *outside line*. *Insomuch*, that a sculptor might make a *perfect model therefrom*; thereby proving, that the outline of the



whole of every part is as necessary to be conceived and expressed as the *outside* line. And if this be perfectly accomplished by a successful combination of the means, a universal outline will be as evident as in that complete statue, or model, which *it ought to be correct enough to produce* to a sculptor. And the *local colour* must so *unite* with all other circumstances of shade, reflection, etc., in *this*, as rather to *improve* the effect than confuse it, as *good* music does poetry.

*This*, it is, which makes the greatest distinction between the practical means of sculpture and painting. What the sculptor accomplishes with the chisel on *absolute substance*, must, in a *due degree* of exactness, be effected on a *flat surface* by the painter. The late eminent sculptor, Mr. Bacon, told me that, "If a correct copy of sculpture (a group especially) did not produce as good an effect as a print would if truly copied from a good painting of the same subject, granting fairly that variation and depth which coloured draperies, etc., etc., must give to such print, the sculptor had not done all that sculpture might accomplish. This idea" (said he) "has governed my compositions, and Roubilliac is a great example of its advantage."

I may surely venture to hope, that what I have communicated of each part in its place will assist you in the pursuit of your studies, and lead you to seek a *good reason* for all the effects you would attempt. When I say *good reason*, I wish you to understand that the *name* only of the greatest master may not be sufficient reason for you to copy him. If you are asked why you oppose purple to yellow, etc., etc., I hope you will *now* have a much more sufficient answer than saying, "Because Vandyke did so." Although it will be proper to caution you against doubting, while you do not possess the science requisite; but I must hope that enough has been advanced to direct your inquiry "Why they did so or so?" and to have given you the same good reason for copying them, which they had for copying nature to that perfection which *some few* have attained.

To say more on the combination of all the separate parts, or means by which the whole may be best produced, would be *binding* you to that systematic foundation, on, and from



which, genius *should rise* with certainty. Look to *Nature* with the eye of *Art*, or you can never hope to imitate her beauties.

P. S. In answer to your query respecting profiles, or “*outside*” lines:—I must first remind you, that it is not within the province of my undertaking to treat on matters that depend on taste; and it is with some diffidence that I range out of my sphere. Persons who think their *profile outline* to be irregular, or overmarked, have a great objection to having their portraits thus painted; thinking that a front view may give a more favourable picture: which you must perceive cannot be a true one, if the profile projections are not made quite as evident by true and judicious light and shade in the *front* view, as when drawn in a *direct profile*. To prove this, study the bust of the Duke of Wellington—What point of view could soften or take off the evidence of his having strongly-marked features, if all the parts and articulations of the other forms of the face, as seen in the model, were strictly attended to? You may take it for granted, that the above prejudice against *profile* originates, and belongs to *black-shade profiles only*; for without the preference due to the antiques, the beautiful profile models of the *present time* will hardly allow one to imagine that any other view of the subject could have been a more advantageous representation. For my own judgment, I must declare, I conceive that strongly-marked features, *viewed*, and closely imitated *in front*, especially under a *high* light, would produce a less pleasing effect than profile; particularly in female faces, in consequence of the *bold shadows* of their projections: while the profile may be so placed *broad to the light*, as to render the effect as agreeable as the form could possibly admit. However, I only offer my particular opinion on this as a theme rather than as a law: and if that captivating expression which charms the soul could be as instantaneously portrayed as it is given when directed to the sympathising feelings of love or friendship, I should give up my arguments for profiles, and all distinguishing remarks on features, and decidedly recommend a preference *to taking the whole soul full in front*; which conclusion leaves you to cultivate acquaintance with those ideas which will

qualify you to judge for yourself on the most advantageous representation of a subject.

Those involuntary expressions of affection which flow from the soul, and convey so much intelligible felicity to the fond parent, the sympathising friend, and the faithful lover; that energetic vehemence which characterises valorous actions—that firm and deliberate mind which sustains the arduous senator, the solid look of justice, the depraved hardness of unconscionable villany, the timorousness of fear, the awkward expression of bashfulness, the lovely and unconscious triumph of innocence, and the various expressions of joy and of sorrow,—*all will impress the feelings* of an *acute* observer, with a decided and very powerful effect. But as most of the characterising expressions of the passions are transient, the most happy and well cultivated genius can only seize *the ideas* of what is required to be conveyed to the canvass, or wrought out on the marble, and digest them in his mind *according to the rudimental information he has acquired*. The gradual progress of *performing a work of such importance*, requires the mutual attention, spirit, and patient perseverance of both subject and artist, wherever those extraordinary felicities are expected from that effect, which is erroneously imagined to be within the miraculous powers of the artist, by means of a happy *glance*, or a fortunate *touch*.

What danger of error must the self-endeavouring tyro be in, when “*a friendly adviser*” (who is fond enough of works of art, and the endeavours of genius, to insist on the title of a connoisseur!) who will tell him “*one happy touch*” will *perfect* the work, and that *he* has been *so fortunate* as to point out *such single touch*, to the completion of a portrait, which had NO RESEMBLANCE BEFORE!!!

A portrait-painter's great dependence is on “the Graces,” most particularly so, when painting handsome females; wherein the utmost efforts of art require extraordinary genius to do justice to his subject; and even to improve on the *plain truth*, by selecting the most pleasing and interesting traits of expression, as well as of forms; aiming at that nice criterion, which distinguishes the *very critical line* which divides flattery from complaisance, still preserving *indisputable identity* of resemblance.

Many ask a portrait painter, why he paints with so high and confined a light, and that only from *one* window or aperture? Its *height* is intended to give a sufficient quantity of shadow, to produce not only a more practical, but powerful effect on the object of study. And why but *one* window? Because the integrity of light and shade is not only more substantial in effect, but much less difficult to imitate. For an experimental proof, set a decanter of water on the table, and study it from a *painter's light*, and the operation would be as simple, and as perfect, as the nature of the object would admit. Then open two or more windows in addition to the painting window, and try another study from the decanter, and you will find such a multiplication of lights, shades, and reflections, as to increase the labour proportionate to the number of windows; and after all, it would *only be the picture of the decanter*, with perhaps no improvement of effect for your trouble.

Here observe, as a *lesson* that will be of material importance in our *next* subjects of inquiry, that the *depth* of shadow so necessary to the best effect, must be studied with the *nicest attention to nature*, as (perhaps I may say) fifty out of a hundred fail in the advantage offered them by an appropriate situation of their model, through incorrectness of imitation, both of shade, reflection, and colour: and *that* which should appear one of the greatest merits of their work, becomes the ridicule of the vulgar, as well as a just object of criticism to the connoisseur, who, expressing his condemnation in a sarcastical vein, compares the dark shadow under a nose to the stain of *black rappee*: this sort of severity may be some punishment to a careless artist, and points out the necessity of attention.

I am now fully prepared to commence my communications on miniature painting, and hope you are quite convinced of the absolute necessity of the preparatory instruction which you have so attentively waited for, although the following letters were written *without any previous teaching* to the young lady to whom they were originally addressed.

## LETTER XXIV.

## ON MINIATURE PAINTING.

MADAM,

I SHALL now give you the copies I promised of the two letters I wrote to a young lady, on the subject of miniature painting; in which you must submit to some repetition of many points, with which my foregoing communication must have made you thoroughly acquainted. I have sometimes thought of abridging them of what they contain of matters previously explained; but have concluded that it would be more to the purpose to repeat the whole as originally written, with a design of giving my system as completely as possible.

A very *tolerable* painting in miniature has been produced by an amateur (from an attentive application to the *following letters*) who had *never before* used a *colour*, and in the specimen alluded to, had no other guide than a black and white print; and since the *first* publication of them, I have received *many* other evidences of the success of my communications on the subject.

## LETTER XXV.

## INSTRUCTIONS ON PAINTING IN MINIATURE,

Containing much Rudimental Information necessary to General Accomplishment in the other Departments of the Art,

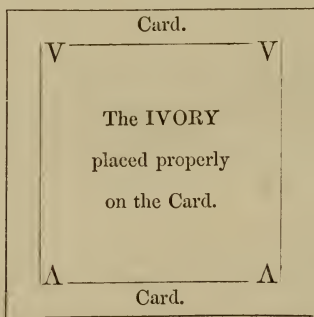
## IN LETTERS TO A YOUNG LADY.

“MADAM,

“I CONSIDER it due to your great attention and the honour you have done me by your improvement, to give you the following general memorandum of the whole process, that you may not be at a loss in any material point, when you will have finished your course of lessons on miniature painting, and can practise without a master.

“The sheet ivory for miniature painting is to be had finely

prepared at most of the water-colour shops, and of ivory turners: the best for the purpose is clear, free from those seams and *white marks* which sometimes occur. They can be had any size which the diameter of an elephant's tooth will admit of. It is best to bleach the sheets gradually for a month in the sun; some boil them. They may be brought to a good state to paint on in half an hour, by placing them at a small distance from the fire. When a sheet of ivory is sufficiently white, it will become in a certain degree opaque, losing that *oily transparency* which is its natural property. You must then scrape it with a sharp *smooth-edged* knife or scraper, till the saw marks are cleared off, and the surface perfectly smooth. Rub it with cuttle-fish, or very finely-sifted pumice-stone powder, till the polish produced by scraping is flattened, and with a large pencil full of clear water wash the surface, and wipe it off quickly with a very clean piece of linen or cotton; or rubbing it with very clean India-rubber will answer the same purpose; it is then fit to paint on. Take great care not to touch the surface afterwards with your fingers, as it will render it unfit to receive the water colour freely. Even the imperceptible perspiration of the cleanest hand must come under this character; and the caution must be strictly observed, for *no other reason* than the one given.



“When your ivory is prepared, cut a card about one inch longer and wider, to put it on, which you may fix in a temporary manner thus:—Lay the ivory even on the card; make a pencil mark at each end of it; and then cut four teeth, or angular points, in the form of a V, at the *corners near the ends* of this pencil mark quite through

the card, pointing inwards, and finishing at the pencil line. Slide the ivory under these four points of the card, and that will hold it secure till you have made your drawing, which



should be done on a piece of wove paper the size of the ivory. I generally lay it over the ivory by sliding it under the same teeth which hold it to the card; it is thus secure enough to sketch on.

“ If you only wish to draw a bust or head, divide the length of the ivory into three equal parts, and let the length of the head be one of those parts; and, to a person of middling stature, place the chin or bottom of the face in the centre: this gives half a head clear above the head, and the length of a head and one-half below, which you will find to fill your ivory very proportionately, being careful to place the chin higher or lower on the drawing, according to the stature of your subject, observing that it *is always* wrong to have the face too *low down*. One-eighth part of the length of the head, either above or below the centre, is nearly sufficient for the tallest or shortest person; that is, one 24th part of your ivory: *discretionary* liberty must be granted in this. And when you paint a pair of miniatures, a gentleman and lady, to match as to size, you may have to calculate the height of female head dresses, so that the rule will require consideration, that the two *faces* may be of right proportion, the one to the other.

“ When you have made a *correct* drawing on the paper, and *completely settled* your composition in pencil (*marked strongly*), raise the corners of the card, and place the drawing under the ivory, which will serve as an outline for your painting, as the ivory will be transparent enough for that purpose. Here you will have an advantage you would not have had, if your first sketch had been made on the ivory—that of moving the paper drawing to that part of the ivory you may wish.

“ To obtain the proper *handling* in miniature, it will be good practice to copy, in Indian ink, a few of the *very best* engravings (after such noble and reputable characters as may be worthy a place in your portfolio), that you may not be perplexed with colours till you can feel your ivory ground; and as soon as that is acquired, you may begin painting *in miniature!* but I should not advise studying from the life, until you have made some copies after good *life-size paintings*. For copying *miniatures* will give you a *little* style, especially as there are very few of much value except as to identity of resemblance,

but what are too highly esteemed by their owners to admit of their being copied. And as to the manner of putting *on the paint*, it is only worthy your attention to know, that it should be done with great care and delicacy, which practice and conviction of *what you have to do* will best produce.

“It may be proper here to assure you, that there should be but *one* distinction between large and small pictures, namely, “*the difference of their size.*” To prove this, I have only to refer you to Mr. Bone’s enamels, and *other well painted miniature copies*, after *large pictures*, which are generally superior to any originals of their dimensions. And as far as regards the *size* of a picture, I will ask, what small original pictures, generally considered, are to be compared with the engravings after some of the largest pictures in the world by Sir R. Strange, Bartolozzi, Woollett, Sharp, Heath, Cardon, etc., etc., which engravings *for size* must be classed with miniatures?

“Teniers, Ostade, Wouvermann, Rottenhammer, Wilkie, etc., prove that the *small dimensions* of a work ought not to lessen its importance: for a *good* miniature must contain all that a *good* life-size picture should, except *quantity*. This, I hope, will settle your mind as to *style*, that you may proceed to the *manner* by which a good miniature may be produced—if you can compose and *draw equal to such an undertaking*; for which I hope my eight first Letters have prepared you. For it would be uncandid in me to proceed, without assuring you that all I can teach you respecting the progress of miniature painting, will not enable you to produce a good picture, in any degree beyond your abilities for *correct drawing*. There is no power in colours that can compensate the defects of *bad drawing*; it must not only be well drawn, but well characterised; which cannot be accomplished without a competent knowledge of forms, and the reasons for light, shades, and reflection, united with a happy taste to arrange the whole to the greatest advantage.

“It is not expected that these accomplishments will shine out in *perfect* splendour in your first essays, but they must ever be the ruling principles of your progress. The mind must be bent on perfection; and you must not turn your beginnings off with disgust, continually entering on something new; but studiously

and patiently correct and complete whatever you begin, to the very best of your abilities: which must not depend on your **BEST WISHES** for a *lucky hit*; but *acquired ability*, through elementary application, whereon alone conviction of *certainty* depends.

“Please to understand, my objection to your making many beginnings, does *not* extend to your *sketch-book*, which may not improperly be classed with the accountant’s *waste book*, wherein you should not neglect to sketch any thought, or circumstance, worthy a second consideration. Your sketch-book will be the sincerest critic, if you make candid reflections and observations on its contents; shewing what you can do, and proving wherein you are deficient, thereby directing you in the clearest manner, to which of the elements you should apply for improvement.

“Now, admitting you **QUALIFIED**,—Use fresh soft water, and the gum water should also be fresh; about one-eighth part gum, and seven-eighths of soft water, is as strong as it can ever be required; but it may be made much weaker for general use with advantage to the picture: some *good painters* use nothing but clear soft water.

“The finest water-colour cakes you can purchase may be much improved by re-grinding, for which you should be provided with a glass, or, rather, porphyry slab, and muller, or levigator. Rub the cake on the slab with very *thin* gum water, till you have discharged as much colour from it as you choose; then grind it with the muller for ten minutes (the strong-bodied paints will require more grinding than the lakes); take the colours off the slab with a palette-knife, and place them on your palette in the following order, or any other you may choose to adopt with better reason.\*

Brown mad- der lake.	Pink ditto.	Carmine- lake.	Vermilion.	Venetian red.	Indian red.
Sippia.	Vandyke brown.	Burnt terra de Sienna.	Raw ditto.	Gamboge.	Yellow ochre.
Black.	White.	Nap. Yell.	Ultrama- rine.	Pruss. blue.	Indigo.

\* *This palette represents the sliding lid of a box of water colour cakes, which I advise as a very convenient improvement on their present lids.*

“Begin your painting on the *ivory* with the utmost attention to correctness of resemblance, not entirely relying on the sketch you have behind; but reviewing and improving the whole to a perfect likeness in this new outline, by tender touches and masses of shadow: do not work too wet, but bring the whole forward by *hatching*, which is making light clear strokes with the pencil, somewhat in the manner of line engraving; and *stippling*, which is dotting, and is generally practised most towards the finish of the work. You must never let the pencil *stop* on the ivory, unless you would leave a solid spot of paint, which is seldom required, because all the colour should be more like a tincture, or dye, than an evidence of substantial paint. This first part is to be *done* with a neutral tint, mixed of Indian red and indigo; but for *flesh*, ultramarine blue, and the madder lakes, will be finer.

“You may draw and paint with this tint, till the whole of that which you can consider shade is completed, paying very little attention to the local colour or complexion of any part, but aim at the likeness with the effect of a plaster-of-Paris bust; observing, as you proceed, that the reflected parts may have a thin warm tint of yellowish hue: *raw* terra de sienna is a good *general* colour for this. This must be done with an eye to nature, and a hand of caution; and all retiring parts, or those surfaces which are seen in an oblique direction, will be *colder* (except when influenced by reflections) than the other parts of the shading; that is to say, bluer, when you have the light side of your subject *toward* you, which is generally the case in portraiture.

“The neutral tint is a retiring colour; take care to use it sparingly and tenderly, recollecting that the local colour, or proper complexion of the part, when added, will decrease the light in a considerable degree.

“In marking the forms of features and muscles, the neutral tint should have more of red than blue, especially the lips; for, if you model them too much with a *cold tint*, you would not recover the coral of the lips. Indeed it will be absolutely necessary to observe when effecting the *modelling*, that is,

when you endeavour to express any part of the *formation*, with a colour foreign to the real purpose, however strong the likeness may become in expression through correctness of form, the *colouring* must be still imperfect. The greatest geniuses for true outline in portraiture, being such through a sort of impulsive sympathy, are most liable to the effects of this error: while young in observation, dashing on at the expressions, just when it strikes them, without due regard to the colour they are going to use. It is this class of picture that appears better in print than in the original; and the observation here required, is for painters in *oil* or *crayons*, as well as *miniature*. The nose and ears, being transparent, will, in *some points of light*, have their shadows of a deep red: this depends on the circumstances of light and reflection, by which you must also be governed in the hue of your retiring tints, by the effect on *your subject*.

“As soon as you have produced a good likeness, as to the *model* or dead colouring, begin to cover the whole with the complexion, both lights and shades, proceeding in a careful tender manner to produce that delicate smoothness, and uniting effect, which are requisite in such minute attempts. This may be facilitated by taking care to have the tint you are using, *pale enough* to prevent your touch from appearing a dark speck. You will find light red (which is yellow ochre burnt), or Venetian red, pink madder, well-ground good vermilion, and raw terra de Sienna, equal to almost all the local complexion you can conceive, when variously applied as your subject dictates.

“In very fair complexions the ultramarine will be found necessary near the inner corners of the eyes, on the sides of the nose, on the temples, and about the mouth, and in all *retiring* parts that are not under the influence of reflection, which will have been attended to in the modelling, or first process, if my previous directions have been rightly given and received.

“Indian red (when fine) is a very useful and durable colour, but, like vermilion, requires a delicate touch, it being an embodied heavy colour, and should be used with *very little*



gum; because all *body colours* will remain as a substance on the surface of the ivory, and too much gum would form any mass of such colour into a *cake*, which would be liable to shrink and scale off from the ivory.

“Now begin to find your deeper shades with a mixture of Indian red, lake, and Indian ink, attending at the same time to brown or warm shade, and increase the local colour, especially the darkest or deepest, and settle all your high lights by delicate touches of ‘fine white,’ as prepared by Newman, of Soho Square, and to be had at most of the colour shops, ready for use, like the other cakes of colour. Observe to keep and use this colour very clean, and, indeed, all of them: use the purest water you can obtain, and have a little thin clear gum water, using it rather sparingly, as it is liable to injury from damp. I have habituated myself to forward the background and draperies immediately after this *first stage* of the likeness, or subject, is in a *satisfactory* state, which you will understand to be when *the whole appears* tolerably correct as to design, light, and shade, but faint, like a very pale impression of a slightly coloured print.

“*Backgrounds*, to any portrait which includes the hands or more than the mere bust (as in locketts), should not be *indefinite* breadths of colour, with no other effect on one’s mind than that of *background*; for a portrait will not only appear lonesome, but unnatural, when the background is not some intelligible description of a place or space, suitable, and properly subordinate, to the principal object of the picture; which, when expressing more than the bust, will require suitable but subordinate accompaniments. Much consideration is always due to this point, but it would carry me out of the sphere within which I presume to be useful, were I to anticipate the province of genius, taste, and judicious observation, by advancing any further information on *this* point.

“I have seen a very natural effect of flesh colour in a miniature, declared (by the painter) to be entirely painted with Indian red, yellow ochre, and indigo only; but yellow ochre does not work pleasantly unless very finely prepared (which now is pretty well done by the water colour manufacturers; I

have found none better than Newman's, Soho-square); yet I have experienced that much may be done with those colours, enough indeed to secure a durable vivacity of colour, when the more delicate tints have faded; and for the whole of the *backgrounds of portraits*, these three materials, mixed agreeably to the system of making the nine principal colours (see Letter XVI.), are most suitable to the forestanding of the higher order of the three primitive colours, which you will use on the portrait.

“When you have completed your design, the ivory may be easily cut to a proper size and shape with scissors, beginning at the sides, and cutting *with* the grain towards the ends; then gum the *back* near enough the edge to prevent it from running under the flesh, as that would give a cold tinge. Place it on a *clean* card the instant it is gummed, and put it between two *very smooth* flat surfaces, in clean paper, under a sufficient weight to press it until it is dry, unless you have a small screw press for the purpose. When your painting is completed, you should fasten it to the glass with goldbeater's skin, or court-plaster, cut in long slips: the goldbeater's skin must be used as soon as it is wet, for, when dry again, its adhesive quality is gone. You must lay the skin on a table to wet it, and let it lie just while you place the picture and glass together *quite even*, and holding them close between your thumb and finger, place the edges on the middle of the slip of wet skin, and it will stick to the glass by rolling: make it adhere closely to the glass and picture, and leave it to dry, when the superfluous skin on the glass can be easily scraped away. The glass should always be a trifle larger than the picture, that its edge may take the skin.

“Take care, *when painting from the LIFE*, or any absolute model, to have some surface, of a proper degree of shade and colour, *placed* behind as a background, to give the best relief possible to your subject; *some compound tint*, approaching to neutral, is (in my opinion) most suitable; but on this point, *genius* takes a free commission, only observing, that if you paint a background to your picture *darker* than that which is really opposed to your view, and *then* study the flesh tint from the

life, while sitting as first proposed, you are liable to *colour* and *shade* it as much darker than nature, as your *painted* background is darker than the one set up.

“Now, consider how little of any *round object* presents itself full to the light and to your eye at the same time; *that space* is all which will require the pure local colour; and the extreme points of projection in these, will shine in some degree, and approach to whiteness: this is easily produced by scraping the colour off. The true and peculiar form of these lights must be as nicely observed as the shape of any of the features or shadows—under *this consideration*, that perhaps after the picture is finished, a sculptor may be employed to make a model of the same subject; and your picture may happen to be the *only means* he can obtain for that purpose; but a greater reason for correctness should govern your study—*truth* and *excellence* demand your best on all occasions.

“The true brilliancy, or natural effect of colours, depends much on a judicious subordination to that light which illuminates your subject.

“Every gradation to *shade* is a gradation *from* the purity of colour, because of the prevailing power of darkness over the evidence of colour: this may intimate to you, that carmine, and red or yellow lakes, will not be found necessary in those parts; which enables you to ensure a greater certainty of durability in the colouring of your picture, ‘because the less brilliant colours are much more permanent than those of the lake kind,’ and often form the tint required.

“A great degree of critical judgment, the most correct taste, and much experience, are required, to determine on *natural colouring*, in true distinction from the showy composition of paints with which some (not ill-drawn) pictures are emblazoned. For, as a finely engraven portrait, if happy in the expression of character, with a tone nicely correspondent with flesh colour, does convey so much satisfaction as some do with only the simple material, *black on white*; a painter, with the *engraver’s eye*, might produce all the engraver’s effect with *any colour*, for we see red prints, or brown, blue, or green, convey the same character, expression, and force, as engravings

printed in black, therefore *some* approach to the general tints of flesh, with good drawing, would produce a very satisfactory performance to the *general* judgment, *while those* who have been so happy as to learn the cause of Titian's superiority in *colouring*, would feel a very contrary opinion, with a conviction that could only be communicated to their equals in the knowledge of the means. Those tyros who are too sanguine, and dislike investigation, depending on mere ocular proof, and (according to the vulgar proverb) they find their object '*ready cut and dried*,' thus saving themselves the trouble of *thinking*, and relying on (perhaps) a tolerable taste for unity and harmony, with regard to composition and expression; they will copy, and look for all the *tints* they want, in a work perhaps very imperfect in that particular, thus establishing the error of their leaders into habit.

"A speedy way of laying a colour for a dark cloth coat is, to mix white enough with the colour you would use, to make it dry to the lightest part of that colour; as thus, for dark blue mix Prussian blue and Indian red, with white, till it will flow like cream (there must not be any gum in the water with which you dilute those mixtures, there being sufficient in the prepared cakes of the colour): lay this over the space you intend for cloth, and it will dry light enough to shade on, with indigo, lake, and Indian ink: the Indian red which is used in the first mixture, is requisite to counteract the coldness of the blue. Blue and white mixed will make a good body colour for blue cloth, if enriched afterwards with a wash of red lake, which must be done with nice dexterity, touching broad, and *but once* in every part, joining each course of the pencil so as to make but one uniform tint. Indigo, Indian red, and yellow ochre, will mix to a good black, which will take some shadow by Indian ink, used without gum-water, and afterwards deepened with gum-water only. But the most genuine way is to *paint* the whole in the transparent manner as in painting flesh, for the very important advantage of giving the lightest parts with truth. Yet many good inferior tints may be produced proper for backgrounds, with indigo, Indian red, and yellow ochre, by mixing them as a *body* colour, and floating



them on the ivory, when laid flat, which should remain so till the colour is dry: and, as all body colours dry differently to their wet appearance, it is a good precaution to try the tint first, on a piece of spare ivory, and dry it by the fire. Unavoidable haste must be the apology for *floated* backgrounds.

“Some painters put silver foil behind the ivory to force a brightness, but the foil is liable to tarnish, and to hurt the effect. Perhaps great care might avoid the tarnishing of the foil: it adds much to the brightness of the colours under which it is placed. *Newman's white*, laid thick on the back of the ivory, over the space occupied by flesh colour, will give great warmth and brightness to the colours, especially if the ivory be thin. Some tint the ivory, behind the parts where white drapery is to appear, with a neutral tint, in order to take off the yellowness of the ivory; but this is not practised by the best painters. Their reason is, that the ivory becomes opaque by time, and shuts out the effect of the colour put behind, leaving the front, in the same degree, meagre for want of it. *Fine* ivory, *properly bleached*, will admit of all the perfection of colouring without any of **THESE** contrivances. There must not be any *bits*\* of paint seen on a miniature; all must be delicate, and as impalpable as possible, enduring the magnifying glass, and improving by the trial; and if you can touch so fine as to make the working imperceptible, so much the better, provided you pay due attention to the greater requisites of the work; as smoothness, *merely*, is not a perfection, unless accompanied with the rest. A Birmingham tea-tray has smoothness in the highest degree, produced by varnishing and polishing; yet *what pictures* do they exhibit! Their manufacturing expedition will not admit of the time requisite to paint a *good* picture: a *dexterous* use of the materials does not (alone) constitute the *proper* use of them, while ‘both’ are equally essential; so that the one cannot supply the want of the other.

\* If you find spots of colour too distinctly seen, moisten a fine stiff hair pencil with *gum-water*, and they may be thus easily diffused or taken off; and if an accidental bit of dust or flue is to be cleared off, touch it with a wet pencil carefully, and in about ten seconds you may *take it cleanly off* with the point of the scraper, which is better than scraping it off without wetting.



How often have we seen works of the highest estimation as to subject, and effect, when seen at such a distance as to preclude the appearance of its rough indexterous handling, or the *coarse granulated* surface on which some *smooth* skies, etc. have been pretended in *small* water colour drawings of late; as to force one to say on closer view, ‘What a pity it was, that so great a genius did not learn that essential in the art, which is indispensable, even in painting a tea-tray:’ and I shall venture to object to that dexterity of hand (except in sketching), which throws *too thick a lump of paint* on the high lights of clouds, because such *lumps* will have *under shadows*; it is not so IN NATURE.

“Always determine that your present work shall be your very best, and wait patiently and attentively for the completion of your picture, before you indulge your flatterers with the opportunity of praising you. It is an intoxicating tribute, and should be received with great caution. When application and experience have rendered your essays worthy a genuine compliment, your constitution for praise will be proof against many of its bad effects.

“In the early stage of your picture, do not be over eager to make it look pretty with *colour*; but proceed patiently with your neutral, or modelling tint. This will look cold, till you begin the complexion; but when that is properly added, you will find the neutral tint vanish, and the whole will appear flesh: take care to preserve a coolness in the *retiring* parts, unless reflected on by a warm colour: and even then, the *effect* of retiring can only be produced by the *cool tint*.

“You may touch broadly and generally in the first shading, to gain your masses speedily; but rather lean to the *careful* style, and *freedom* will arrive, in its proper time, as far as it is possible in this minute sort of work; for you must never expect to perform a **HIGHLY-FINISHED** picture speedily. The only possible means of gaining time, is to learn what *you have to do*: with this sort of forecast much time may be gained.

“Breadths of colour, of any considerable degree of depth, may be laid on ivory, in the same broad manner that you would observe in laying the various shades in an Indian-ink drawing

on paper; but you must never retouch a *wet* part, for that would draw off the colour, and give you much unnecessary labour in the finishing; but when you can decide on the general effect with some certainty, you may obtain it (I may say) *rapidly* by a judicious observation of method; this it is that enables an accomplished artist to surprise, by those rich and instantaneous effects which *impatient* amateurs *wish* to display *without submitting to the study of all that supports such effects*; namely, GOOD DRAWING; with *true taste, which, however innate*, can never be displayed to advantage without thorough accomplishment by practice. Many miniature painters, especially those who confine their practice to miniature solely, are self-taught as to practical methods, and seldom acquire the facility which may be practised, even on ivory, without any detriment to the final beauty of what is termed *high-finishing*; a course of study in landscape under some of the accomplished exhibitors in the water-colour gallery, will be of the utmost advantage to most *self-taught* practitioners.

“ Habituate yourself to look enough at your subject, to learn to a certainty that your next touch will improve your work; and draw *what you see*, and *as you see* it, or, what you *know* to be, may deceive you. For instance, you know the top of a wine-glass to be a circle; yet it generally stands in a point of view to appear an oval; *this* is enough to prove the absolute necessity of learning the art of *drawing* objects *as you see them*, which art is PERSPECTIVE—and it is the basis of success to that portion of a picture which may be termed *descriptive*. When you have made yourself thoroughly acquainted with the methods I have given, and can practise accordingly, I shall see by your performance wherein either the tutor or pupil is deficient, and will make my remarks thereon the subject of another letter; and remain,

“ Madam,

“ Your obedient Servant.”

## LETTER XXVI.

## MINIATURE PAINTING CONCLUDED.

“ MADAM,

“ I EXPECTED the neutral tint would not meet your entire approval at first, as it is very difficult for a young practitioner to look on a fine complexion, etc. without being drawn off from the consideration of a colourless form: but if you can persevere in preserving the three distinct properties in your subject separately (if only in idea), your work will proceed systematically; *perfectly comprehending*, first, that a *true* outline *must be obtained*; and, secondly, that mere *lights and shades are not local colours*; and, thirdly, that *the local colour*, with due observation of *shining* and reflections, *must be general in both light and shade*. I have no objection to your *carrying all on together*, when you *know* that you are both *practically* and *scientifically* qualified; but, in my humble opinion, a *young artist* is to be compared with a young musician, who attempts to play three parts at once, before he can play one part well.

“ The most perfect method of oil painting, or using colours embodied to their various tints with white, is to determine as nearly as possible *that each touch of the pencil shall give the full effect of the part it covers, with no more blending than just to unite them to a natural effect, all rather lighter than the finishing depth*; which finishing is most usually performed with transparent tinctures of the various colours, without white, which, in oil painting, is termed ‘*glazing*.’ Now this ‘*glazing*,’ or *transparent* system, is almost the *whole* system of miniature painting, and so well admits of progression, that *form, shade, and colour*, may best be learned and done separately, till their united effects can be comprehended under *one process*.

“Your queries about the colours of reflections on flesh, are very pleasing proofs to me, that *you think* on what you do; and the vast variety, on which the truth of reflection depends, admits only of a general conclusion in answer. You have already been told that reflected parts of *white* objects, are, in general, warm or yellowish; and that their retiring parts are generally cold or blueish, when unaffected by other local reflection; these two, when united, would produce a tint of a greenish hue, but that they will *compound with the complexion* or local colour, and with the *shade*, when appealed to in *painting*; which, like all other *triple* compounds, become to a certain degree neutralized; therefore, from the many circumstances which may occur to vary any given rule,—reason, practice, and observation of nature must be your guide.

“*These are the parts of a picture* which depend much on the harmonizing power of the eye. *Genius* must here find proof from reason and *visible* evidence (as no effect can be relied on, where the cause is not clearly understood to exist), and rest on a better origin than either fancy, or (uninvestigated) examples: yet rather follow *well-recommended* example, than doubt or object, while your own judgment is immature; and, with study, the knowledge of the causes may unfold themselves to your satisfaction as you proceed.

“That kind of faculty is necessary to success, in the department of fine and harmonious colouring of shadows reflected on, which is either natural or acquired in a musician, who is master of the VIOLIN; *taste* and *practice* enable him to stop or finger the strings, in tune—whereas, on a *keyed* instrument, that faculty is fully provided by the maker and tuner of the instrument: and although that *shaded* colour, which is accompanied with any reflection, cannot be faithfully represented, without the assistance of the *three primitive colours*, the whole consideration of *natural colouring* might be lost by *mixing* them, although the ‘*engraver’s effects*’ might still be preserved.

“Look at nature, and you never conceive *black*, except as a local colour: study *shade*, abstractedly, and no thought of colour will impress your ideas.

“Now, to unite these distinct conclusions to practical advantage, you have only to consider the property of each colour, as regards *colour*, so as to apply them separately and produce a natural effect; as is perfectly exemplified in the works of Rubens and Titian. Even a study from white marble, or any other white object, requires the above considerations, where natural effect of colouring is presumed; because the reflection of colours from surrounding objects, compounds with the simplicity of the white object, so that the plain light and shade, which, to a superficial observer, seems all that can be required, would only produce a print effect, and not unite with surrounding effects.

“I observe that you leave the shading of the globe of the eye, or that part which *is* white, too much so, and unfinished: you must consider how small a portion of absolute white would be found on any white globe; and when you attend to the overshadowed situation of an eye, by the thickness of the eye-lid, and the additional shadow caused by the eye-lash, you will find it impossible to have any real white in a well-painted eye, except the glittering reflection of the light, which will seldom be more than one speck, which must be placed with the utmost attention to the original.

“In answer to your question, How must I paint white drapery? I can assure you there will be a very small portion of *pure white paint*: you must form the whole by tender, delicate shading, with a cool neutral tint; and the whiter you bleach your ivory the better, both for this, as well as all other colours. The reflection tint, and also the retiring, must be used in white drapery; and when all is nearly formed, touch the edges of a hem, or the points of lace, the highest lights on the shoulders and breasts, with *fine* white; which, if done according to your model, will produce a white drapery. Need I say, Heighten the lights on pearls, and the glittering of diamonds, gold, silver, or satin, with one speck each, of the fine white; tinting them afterwards to their peculiar keeping with a thin touch of suitable *transparent* colour? Even the *comparative* effect of glittering (such as is found on polished metals, and jewellery, or any glossy matter), can only be produced in



those parts that are at least so far in shade as may be called *half shade*.

“ To paint HAIR well is very easy, when compared with the judgment requisite in the drawing and composition of it. This is one of the great tests of true taste. The colours to be used in hair can only be dictated by its local colour; but I find the various degrees of *brown hair* can be given by tempering Vandyke brown, Indian ink, and red lake, to the colour required, observing that hair is ‘*transparent*’ and ‘*glossy* ;’ all the masses of light will be coldest; the absolute shades will be tempered with the colour of the hair in a very small degree; the less absolute shades will have more hair colour; and the parts which neither shine nor are in shadow, will be the colour of the hair.

“ It is the transparent property of hair, to present more of its colour when loose and relieved by some light-coloured surface behind it, while *lighted* on the side it is viewed, than when plaited close or laid smooth to the head; for then the lights will be cold and glossy. These are the best directions I can offer for a general rule; but you must study these matters according to the circumstances of light, shade, reflection, and their own peculiarities. The local colours which commonly occur in hair, are, burnt umber, Vandyke brown, and sepia, with various gradations of Indian ink, brown madder, red lake, and indigo, as shade; but reflection will so affect any *glossy* matter, that all must be ascertained by the accompanying circumstances.

“ Whenever you find the united effect of form, substance, and colour, too much for your practical comprehension at once, return to your *systematic clue*, securing the forms first, then the substantial appearance by shading, and finally the colours and reflections; each separately, according to the directions in Letter V., and in Letters X. and XXII.

“ It is not very good practice for a young student to work on the flesh in the absence of the subject; particularly when the picture is a *portrait*; not only on account of the necessity of strict adherence to the peculiarity of form, but also to the

colouring: but this must be regulated by your own confidence in what you know may be safely and truly done to forward the picture. For instance, where time is an object, you may have attained all your drawing and shading by a bold, broad, and open touch. In such a case, an *experienced* artist would proceed to blend and fill up all the spaces, uniting all to one agreeable state, with the colour or shading suited to each part, preparing his picture well for the next visit, and so far advance the finishing.

“ You wish to know *how long* a good miniature ought to be in hand—I cannot give you any direct answer; but must say, it is a question that no painter ought to consider, *or be asked*, except with a view to the arrangement of other engagements. I may here fairly remark on the hurry, inconvenience, and frequent disappointment of both employer and painter, by those ladies and gentlemen who determine to sit *before leaving town*, but postpone it from time to time, till perhaps within a week of their intended departure: ‘ *It must be done,*’ is the word, without glancing a thought (till too late, if ever) that an artist is not like a master tailor, or other mechanic, with forty pair of hands, or as many more at command, according to the exigencies of trade. Such perplexing miscalculations unfit a painter for the delicate work required of him. All is anxiety and endeavour in the art itself at best; and when the hurry and impatience of his employer are added to this, it may very probably overthrow the success of the work. It is advisable to employ an approved artist, and (while the object of his study) give up as much command to him as possible; the ultimate result will always answer this proceeding. *Patience, perseverance*, and sufficient ability, will complete a picture in *proper time*. You must make up your mind to this fact, that *painting well*, as it is one of the most rational and delightful amusements, WILL ALWAYS REMAIN ONE OF THE MOST DIFFICULT; totally independent of the mechanical view which I am endeavouring to give you of practical modes, but considering always, that ‘ *painting well*’ implies the producing *faithful representations*. And, when nature is brought under the MICROSCOPIC SIZE of A MINIA-

TURE PICTURE, 'tis most certain that all the difficulties of the art are increased in the same degree that truth is faithfully appealed to: and necessarily require extraordinary exertion both to attain and practise with success. *Ambition of excellence, necessity, or a natural impulse*, must be the stimulus. I hope the first and last of these you possess. Had I been writing to a gentleman, I might have observed, that they are TWO excellent spurs to Pegasus, and should conclude that a bridle would also be requisite to restrain the Muse to a regular pace. If what has been communicated may be the means of rendering your journey towards Parnassus more easy and certain than it otherwise would have been, it will give me the utmost satisfaction, and I shall ever remain,

“ Madam,

“ Your obliged, obedient Servant.

“ P.S.—I have had AMPLE *proof* that continual practice, along with a *thorough comprehension* of the practical rules I have advanced, will not fail to ensure you equivalent success.”

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#### ON CRAYONS, OILS, AND OTHER MATERIALS.

MADAM,

I SHOULD endeavour to comply with your demand on the art of painting in crayons, had not the late Mr. Russell superseded the best I could say on that subject, by his publication of a complete treatise, not only of the art of using, but also of making crayons; to which I should think it best to refer you, but I fear it is out of print.

My practice in crayons has been chiefly on very small portraits, and various effects of landscape, generally on vellum. I shall not withhold from you the methods I have found to answer, as far as my experience in this mode of painting has qualified me; but by no means would I be understood to offer it in lieu of the work to which I have referred you.

My first care is to get good materials. *The Swiss crayons* are (in general) the most pure. The vellum must have a soft velvet-like nap, or smooth roughness, on the *outside* the skin, sufficient to hold the colour. Mr. Russell, in his excellent essay on crayons, raises an objection to *vellum*, which my practice of forty years' proof enables me to consider groundless, for I know of none of my *earliest* paintings which owe any part of their defectiveness to the *vellum* on which I did them; although, till within the last four years, I bought the *usual drawing vellum*; since which, I have turned my thoughts to the preparation of vellum, with a view to dispossess it of the animal oil, which Mr. Russell objected to. I considered that vellum for pictures, after being once secure on the straining frame, is no more liable to the *wear* of rolling and unrolling, or folding, etc., etc., as writings are; and by consulting the manufacturers, I found that vellum might be rendered as calcareous as required. This has been most successfully done for me, by Messrs. Starkey and Cripps, of Newgate Street, and afforded an advantage which I had not calculated on, by making the vellum require more crayon to fill it, and retaining it much more firmly than on common drawing vellum. *Continual dampness* is known to be injurious to *all* painting. The vellum must be strained tight, by tacking it on a straining frame, on which should previously be pasted a piece of stout *white* drawing-paper. If it be possible, strain the vellum in damp weather, or lay it cleanly covered in a damp place the night before you strain, then the surface will always be smooth; for vellum strained in a very dry state, as in summer, will relax in damp weather and become uneven. When the vellum is strained, set it in the sun, or at a distance from the fire, to harden; then, with an elastic cane, or rather a piece of dry linen, flap it well, to discharge all the whitening which the manufacturers leave in it: this makes it take the colours more plentifully, and gives the dark ones their full force.

Stout, but fine, wove-drawing paper, tightly strained on a frame, or drawing-board, rubbed with a fine pumice-stone, will take crayons well for large subjects. Care must be taken to

discharge all the powder of the pumice-stone from the paper; after which, sponge it well with a very clean damp sponge, and let it dry for use.

First draw your subject as correctly as possible with charcoal; touching very tenderly: for if used too freely, *vellum* will retain too much of it. When the drawing is sufficiently marked, flap off as much of the charcoal as you can; and there will still remain a very visible sketch: then begin the painting, by covering all the darkest masses with the darkest tints; using *as little of the crayon as possible*, and driving or spreading it with a leather stump, leaving no more paint on the part than sufficient to stain or tint it (nearly) to the proper depth and colour; bearing in mind all my elementary laws, respecting the proper effect as to light, shade, and colouring; and covering the whole vellum in this manner, as quickly as the nature of the study will allow, to obtain a general idea of what the picture is to be. Thus, having overcome the whiteness of the vellum, proceed to study the portrait, using a neat-pointed, hard-rolled paper stump in those minute parts where the *leather* stump is too large; preserving the lights broad and untouched, and marking the shades deep, but very spare of crayon: thus proceed till all is *tintured*, rather than embodied with paint; taking care to keep the shades as deep as can be required at the finish, and the lights as *bright* and *pure* as possible; never suffering a light tint to cover a part which must ultimately be a shade, as that would produce a chalky effect. In these small pictures, you can *mark* much of the drawing (with a passable effect of truth as to colour, because of *shade*) with the hard native black and red chalks. There is a good deep black composition, called Conti chalk, very useful in its proper place.

Now begin to touch with the crayons, sufficiently with regard to quantity, to cover the whole of the flesh as near to nature as you can, carefully blending or softening them together with the finger, pressing a little, to fix the colour firmly in the vellum: the *leather* stump must now be laid aside; but a piece of good sound cork, cut to a smooth *blunted* point, is still useful as a substitute for the finger, in the minute parts of the work.

Take care that the whole surface of your picture is fully



covered with paint in the *lights*, and as sparingly as will cover in the shade: as it is a great accomplishment in crayon painting, to arrive at the true effect without a superabundance of colour. Therefore, when your vellum is uniformly filled with paint, no more should be put on, but all corrections of colouring, particularly the darker tints, must be made by scraping off the wrong colour before you give the improving one, which may be done safely without injuring the vellum. Paper grounds *need not* be scraped, but a hole may be cut in a piece of writing paper, the shape of the place you would clean; laying it correctly over the part, whether on paper or vellum, and, by rubbing it with crumb of bread, dry sponge, or cotton, enough of the colour will be discharged.

When blending *crayons*, observe, that the dark tints will rise through the light ones; and, on the contrary, the light tints will weaken, and always render deep colours *chalky*; but this may be all turned to advantage by sufficient practice and reflection, as both may be required, under some circumstances, to produce a natural effect.

A *red tint* of the *pink* class will clear any dirty part of flesh that is not of the red class; a tint of a light-greenish cast will *take down* red in reflected parts, but must seldom touch the full lights of flesh (the *best way* is, to *discharge* the wrong colour, and use a right one in its stead). If you regard the durability of your picture, paint with such colours as are strongest in their original natural state: ochres, umbers, and earths, both raw and burnt, are of this description, and agree best with the whitening with which the gradations of tints *should be* made up. *Fine genuine lamp-black* is the only black that should be used in crayons, and that only when unavoidably requisite; or, should you not feel confident in your *lamp black*, a good black may be made by mixture of *indigo*, *brown madder lake*, and *burnt terra de Sienna*; a little India yellow may be added, if too purple a tint rises from the above mixture: *this will not* mildew.

The best white for the general mixture with *all the colours*, is the *flake*, or uppermost stratum of the whitening, when it is in pulp, in large quantities, at the manufactory, ready for

moulding, because all the gross and heavy matter has precipitated towards the bottom.

Some think they procure this flake by dissolving a few lumps of whitening: but it is inferior; because, after all, it is only the flake of an inferior stratum. *The pure first flake of the whole* is worthy the trouble of applying for at the manufactory. *Newman's white* might be used for *entire white*, and some of the finest tints of the three principal colours may be embodied with it.

The late Mr. Morland (father to the great genius of that name) made the very best crayons I ever possessed.

Sufficient grinding of all the colours is an important object. They may be made up with various glutinous liquids, diluted. Skim milk, small beer-wort, and gin, are the three generally used; the clearness of gin suits the light tints. Mr. Morland used gin, as the best of the three, for the purpose. Beer-wort will do well enough for all the darker tints (*I use skim milk only*). Practice and experiment are *wanting* in this department, which I leave to the ingenious and industrious, under the assistance of the treatise recommended; but practice and proper thought will qualify any one to make crayons.

Provided you make no more use of the following expedient than just to ascertain the best manner of first laying on the crayons, you may depend on its great efficacy. I find this caution, as apology, proper; because the examples I shall propose, although (*manufactured*) from the works of eminent artists, are far below that perfection, as pictures, which is wisely recommended for the proper formation of the best style, and are as much inferior to ultimate excellence, as the rough *foundation* stones of a pedestal are to that out of which the statue should be formed; from which I argue, that the proposed subject for imitation being intended as a sort of *foundation* only, on which future excellence may find a certain support, I shall forthwith venture to shock the lofty taste of those who scorn progression, and, if I may so describe my ideas, "*are always jumping at the pinnacle.*"

*Paper printed in colours, etc.*, for the hanging or ornament of rooms, is printed with a sufficient number of blocks, so inge-

niously matched, as to complete a certain good effect; each block performing its part by an impression of one of the several colours required in the pattern: by which means as perfect a representation as this ingenious association of the several separate tints can produce, is obtained. (Look at some good paper-hangings attentively, and you will the better comprehend the instruction.) There are some productions of this sort, particularly of *ripe fruit, flowers, etc.* (broad bordering) of so good an effect, that I have proved them to be an excellent *first* key to *using* crayons; because each tint, in *such specimens*, has its *distinct* shape, and can be easily matched in a *full* set; which, with the softening property of crayons, may be finely blended together with the finger, so as to produce at least a very finished and pleasing effect, even more like the *original* design than the paper-hanging, which you may study after. By copying some of *these* with tolerable mechanical precision, and having learnt therefrom how to arrange the first lays of colour, you will have finished the “foundation,” and must proceed to the finest specimens of painting, and of nature, to complete your system.

With regard to PAINTING IN OIL, I shall say little more than refer you to the best works published on the subject. “*The Art of Painting in Oil Colours*,” by Bardwell, will give any one a very pure and proper method, who *begins* with its instruction. I know systems of this sort are under the prejudice of those who have previously habituated themselves to other modes; but so far as the choice of materials, the preparation and arrangement of them for the palette, and the application of them to the canvass, it may be safely adopted in preference to the practice of those whose works would have been a *lasting* ornament of the art, had their methods and materials been better understood. I shall offer you the best system of practice that I know of, with the palette set *according to the book above recommended*.

As it will be most likely, as well as most proper, that you should begin the use of oil paint, by *copying*, first draw with *white chalk*, or a pipeclay crayon, as perfect an outline of every part of the original picture as you can, according to the

system you have learned in my Eighth Letter of this book, for your first sketched outline with charcoal; then go over again with a correcting eye and hand, with a soft black-lead crayon or pencil, and wipe away the *white* outline; it will be proper to notice much of the shadowing (*especially of the extremities of figures*) by pencilling. This, if well done, will settle character and expression. Then begin with Vandyke brown, to secure the whole by a firm outline and careful attention to such shading as conveys a modelling effect, and touch all the high lights with pure white; and as this stage of your work is to render all the drawing perfect, you should attend tenaciously to the form and depth of all the shades, so that, when finished, as preparatory for colouring, it should look like a tolerably well-finished drawing in Vandyke brown, leaving the canvass for a tint, wherever it will answer the purpose. Now begin with your *colours* to lay an *equal thickness* of paint over every part of your study, so that the canvass may be fully covered with *embodied* paint, that is, "colour mixed with white," filling up each portion of the whole with a tint as nearly like the original as possible, but not to the full depth of its dark parts: the whole should be paler than the original, because no finished part of a picture should have a darker tint under it, *especially of the shade* class such as have *black* in them; but you may put a lighter tint on a deeper of the *red* class, as in flesh, and it will have the effect of the skin over the natural blood. Let all your first painting of the flesh have a *rose* tint, rather than that of a *crocus*, as there will be *oil* enough worked into the picture in the course of your labour to produce the "*warm hue*" in a very short time, which I do not advise you to consider as any requisite to the picture. The substance of your picture, as necessary for its durability and power to abide the ravages of picture cleaners, depends materially on the full body of paint with which the canvass is first covered, and eminently so, with regard to the *true colour* of each part, because, so much of your picture will stand the test of time and the picture cleaner, with the least possible injury. When you have completed your first lay in this plentiful manner, you may use a softening brush to smooth

and blend the surface preparatory for further study. As you will not be able to perform the whole of this very important stage of your work at once, you will of course use the softener on the parts you cover, while the paint is moist; for it will be too late when the colours begin to harden.

Should you succeed in the work thus far, your copy will be in a fine state for your minute attention to the forms and effects of each object, by securing the depths and colours of all the gradations of shades and colours from the darkest first, to the lighter, until you are driven, as I may express it, to the principal apparent projections, or lights, which you will most likely find about the chief point of interest in the original. And when you have produced the *general* effect on your copy, when compared at a distance, begin to work up *every part* tenaciously to the original, until you can discover no difference whatever, except in a certain freshness in your work, which *time* will too soon divest it of. Take care that all the tints on your palette be of an equal state of moisture, so that all should flow under the pencil alike. Do not dwell on the light parts of the picture in its early stage; but bring on the whole general force and effect by securing, *first*, all absolute and total shades throughout your picture in their proper class, as nearly as possible (never losing the drawing which was your previous consideration); then the next class of depths and their colours in the same order; then the third, with all their tender and subtile ascendings into light, where, if you successfully arrive, your study will only want that refinement of attention which is always required on the *broad lights*, because the model of every form must be expressed as perfectly there, as in the more easily determinable shaded parts.

Your first observation on the general hue of an old picture you would copy, should be to search out a part which you are certain was touched *originally* with pure white, then take a piece of pure white on the palette knife, and compare it with the original. You will thus find what degree of lowering the whole picture has sustained by time; and if you begin the *painting* of your copy by securing this point, or mass of pure white, and let it remain unaltered, as the key-note to your



copy, if you possess *due* harmony of eye, the whole copy will, by *this rule*, become what the original was when first painted.

An old experienced artist (whose works are sufficient evidences of the truth of his testimony) assured me, that spirits of turpentine, mixed with a very small portion of good nut oil, was the only vehicle he had made use of in painting; which, when finished, had a dry calcareous appearance; but when varnished with *mastic* varnish, all came forth with excellent effect, and would *neither crack nor change colour*, except from the slow but certain power of *time*, on all similar materials. If a gallon of *raw linseed oil* be buried in a hot-bed, or the earth, for three months, the greasy matter settles at the bottom of the vessel, and nearly half a gallon of fine clear vehicle is obtained, which dries well, and does not change the colour.

But numerous other vehicles can now be procured which may have their peculiar advantages.

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#### TO PAINT TRANSPARENCIES.

THE material for working on, is *fine* cambric muslin, which must be well covered with any fine clear size—those made of white leather, or parchment cuttings, are the best. While wet, the cambric muslin must be strained very tightly on a frame, and when dry should be passed over lightly with a pumice stone, which will very much improve the surface for working on. The colours to use are, any or all of those of a transparent quality; the vehicle, spirits of turpentine mixed with japanner's gold size—the tools, camel-hair pencils, plenty of clean linen rags, and a penknife with a point of this shape—



Having sketched the subject with a soft

lead pencil lightly, outline the principal objects with either water or oil colours: water colour will dry almost immediately; proceed then to lay in the sky, the tints for which should be mixed separately in saucers, and rubbed in lightly with the linen rag; then the water or distance, and lastly the foliage,

rocks, etc., etc.; little or none of the japanner's gold size should be used with the light tints, as it dries too fast;—in the dark parts of the subjects where crisp lights are required, or indeed in any other part where they are requisite, a mass of dark colour of a warmish tint, may be laid over the ground colour, and after being allowed to dry a little, they may be scraped out to the greatest nicety with the before-mentioned penknife: when this is all dry, the tints may be strengthened and mel-  
lowed by additional colour, and where great depth is required, it may be obtained quickly by colouring the other side of the blind. All the work should be done with the subject between the painter and the light.

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A composition for painting, in imitation of the ancient Grecian manner, is explained by additional communications in the 25th vol. (1817) of the Society for encouraging Arts, Manufactures, and Commerce; as discovered and successfully practised by Mrs. Hooker, of Rottingdean, near Brighton, and first published in the 10th vol. of the Society's Transactions, for the year 1792. This method precludes the use of oils and *turpentine* varnishes; and is therefore (if only in this particular) finely adapted for amateurs of delicate constitutions. The process is simple and wholesome, and appears to possess all the fineness of oil paints.—C. H.

\* \* \* The notes to Eastlake's translation of Goethe's "Theory of Colours," are to be highly prized; and should be carefully studied by the more finished student in the art of oil painting.

## PAPER IN POLITE ARTS.

The THANKS of the Society were this Session voted to Mrs. HOOKER, of Rottingdean, near Brighton, formerly Miss EMMA JANE GREENLAND; for Additional Remarks to her Method of making a Composition for Painting in Imitation of the Ancient Grecian Manner, as published in the 10th Volume of the Society's Transactions, for the Year 1792.

A Specimen of this Mode of Painting is preserved in the Society's House.

SIR,—I had the pleasure to communicate to the Society for the Encouragement of Arts, Manufactures, and Commerce, in 1786, when Miss E. J. Greenland, my method of painting in imitation of the ancient Grecian manner, or incaustic painting, and in consequence, they did me the honour to adjudge to me the Gold Palette, and also afterwards to approve my account of the result of above fifty experiments per day, which I made during more than four months in 1792, in the hope of discovering some means of making wax, gun-mastic, and water unite like a cream, in order to expedite the formation of the composition for imitating the incaustic painting, which was published the same year by the Society of Arts. I now take the liberty of sending them another copy, but with some alterations and many additions, which I trust will be found calculated to facilitate and improve that method of painting, as they have arisen from much observation and reflection on several pictures I have painted since I had last the honour of addressing the Society. In consequence of the application of several gentlemen of the profession, I have drawn up this paper, which, considering the former attentions of the Society, I thought it would be proper for me to offer first to them for their acceptance; but if they should not think it worthy of communication, I hope they will pardon the intrusion, and attribute it only to the sense of gratitude I feel for the honour already conferred on,

SIR,

Your most obedient Servant,

EMMA JANE HOOKER.

*Rottingdean, Brighton, March 16, 1807.*

To CHARLES TAYLOR, M.D., Sec.

METHOD OF PREPARING AND APPLYING A COMPOSITION  
FOR PAINTING IN IMITATION OF THE ANCIENT GRECIAN  
MANNER.

PUT into a glazed earthen vessel, four ounces and a half of gum Arabic, and eight ounces, or half a pint (wine measure) of cold spring water: when the gum is dissolved, stir in seven ounces of gum mastic, which has been washed, dried, picked, and beaten fine. Set the earthen vessel containing the gum water and gum-mastic over a slow fire, continually stirring and beating them hard with a spoon, in order to dissolve the gum-mastic: when sufficiently boiled, it will no longer appear transparent, but will become opaque and stiff, like a paste. As soon as this is the case, and that the gum water and mastic are quite boiling, without taking them off the fire, add five ounces of white wax, broken into small pieces, stirring and beating the different ingredients together, till the wax is perfectly melted and has boiled. Then take the composition off the fire, as boiling it longer than necessary would only harden the wax, and prevent its mixing so well afterwards with water. When the composition is taken off the fire, and in the glazed earthen vessel, it should be beaten hard, and whilst hot (but not boiling) mix with it by degrees a pint (wine measure) or sixteen ounces more of cold spring water, then strain the composition, as some dirt will boil out of the gum-mastic, and put it into bottles: the composition, if properly made, should be like a cream, and the colours, when mixed with it, as smooth as with oil. The method of using it, is to mix with the composition upon an earthen palette, such colours in powder as are used in painting with oil, and such a quantity of the composition to be mixed with the colours as to render them of the usual consistency of oil colours: then paint with fair water. The colours when mixed with the composition may be laid on either thick or thin, as may best suit your subject, on which account, this composition is very advantageous, where any particular transparency of colour is required: but in most cases, it answers best if the colours be laid on thick, and they require the same use

of the brush, as if painting with body colours, and the same brushes as used in oil painting. The colours, if grown dry, when mixed with the composition, may be used by putting a little fair water over them; but it is less trouble to put some water when the colours are observed to be growing dry. In painting with this composition the colours blend without difficulty when wet, and even when dry the tints may easily be united by means of a brush and a very small quantity of fair water. When the painting is finished, put some white wax into a glazed earthen vessel over a slow fire; and when melted, but not boiling, with a hard brush cover the painting with the wax; and when cold, take a moderately hot iron, such as is used for ironing linen, and so cold as not to hiss, if touched with anything wet, and *draw it lightly over the wax*. The painting will appear as if under a cloud till the wax is perfectly cold, as also, whatever the picture is painted upon is quite cold; but if, when so, the painting should not appear sufficiently clear, it may be held before the fire, so far from it as to melt the wax but slowly; or the wax may be melted by holding a hot poker at such a distance as to melt it gently, especially such parts of the picture as should not appear sufficiently transparent or brilliant; for the oftener heat is applied to the picture, the greater will be the transparency and brilliancy of colouring; but the contrary effects would be produced if too sudden or too great a degree of heat were applied, or for too long a time, as it would draw the wax too much to the surface, and might likewise crack the paint. Should the coat of wax put over the painting when finished, appear in any part uneven, it may be remedied by drawing a moderately hot iron over it again, as before-mentioned, or even by scraping the wax with a knife: and should the wax by too great or too long an application of heat form into bubbles at particular places, by applying a poker heated, or even a tobacco-pipe made hot, the bubbles would subside; or such defects may be removed by drawing anything hard over the wax, which would close any small cavities.

When the picture is cold, rub it with a fine linen cloth. Paintings may be executed in this manner upon wood (having first pieces of wood let in behind, across the grain of the



wood, to prevent its warping,) canvass, card, or plaster of Paris. The plaster of Paris would require no other preparation than mixing some fine plaster of Paris in powder with cold water the thickness of a cream; then put it on a looking-glass, having first made a frame of beeswax on the looking-glass the form and thickness you would wish the plaster of Paris to be of, and when dry take it off, and there will be a very smooth surface to paint upon. Wood and canvass are best covered with some grey tint mixed with the same composition of gum Arabic, gum-mastic, and wax, and of the same sort of colours as before-mentioned, before the design is begun, in order to cover the grain of the wood or the threads of the canvass. Paintings may also be done in the same manner with only gum-water and gum-mastic, prepared the same way as the mastic and wax; but instead of putting seven ounces of mastic, and when boiling, adding five ounces of wax, mix twelve ounces of gum-mastic with the gum-water, prepared as mentioned in the first part of this receipt: before it is put on the fire, and when sufficiently boiled and beaten, and is a little cold, stir in by degrees twelve ounces, or three quarters of a pint of cold spring water, and afterwards strain it. It would be equally practicable, painting with wax alone, dissolved in gum-water in the following manner:—Take twelve ounces or three quarters of a pint of cold spring water, and four ounces and a half of gum Arabic: put them into a glazed earthen vessel, and when the gum is dissolved, add eight ounces of white wax. Put the earthen vessel with the gum-water and wax upon a slow fire, and stir them till the wax is dissolved and has boiled a few minutes; then take them off the fire and throw them into a bason, as by remaining in the hot earthen vessel the wax would become rather hard; beat the gum-water and wax till quite cold. As there is but a small proportion of water in comparison to the quantity of gum and wax, it would be necessary, in mixing the composition with the colours, to put also some fair water. Should the composition be so made as to occasion the ingredients to separate in the bottle, it will become equally serviceable if shaken before used to mix with the colours.

I had lately an opportunity of discovering that the composition which had remained in a bottle since the year 1792, in which time it had grown dry and become as solid a substance as wax, returned to a cream-like consistence, and became again in as proper a state to mix with colours, as when it was first made, by putting a little cold water upon it, and suffering it to remain a short time. I also lately found some of the mixture composed of only gum Arabic water, and gum-mastic, of which I sent a specimen to the Society of Arts in 1792; it was become dry, and had much the appearance and consistency of horn. I found, on letting some cold water remain over it, that it became as fit for painting with, as when the composition was first prepared.

EMMA JANE HOOKER.

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*Rottingdean, Brighton,  
Sept. 24, 1817.*

Mrs. Hooker's best compliments to Mr. Hayter, and has the pleasure of answering his questions, which she received this morning, respecting her method of Incaustic Painting; she has always prepared the vehicle (or what she calls "cream," as it has that appearance) herself, in order to be sure of the exact proportion of the different ingredients; as a deficiency in any one might alter the effect of the colour, when heat should be applied to them. In general she has not found the ingredients to separate till a length of time after the composition has been made, but which is never of any consequence, if the bottle be shaken, or the composition in it so stirred as to mix it thoroughly, and occasion a due proportion of the ingredients to mix with the colours. The warmed iron *must touch* the surface of the picture, which process is chiefly intended to smooth it; which is fully described in the printed receipt. She has often smoothed the surface of the wax by scraping with a *very* smooth-edged knife. She does not know that the painting can be retouched, after the coat of wax is applied; but she has materially improved many pictures by repetitions of heat partially to such parts as required more force.

Mrs. Hooker has most usually painted with the cream, composed of gum Arabic, gum-mastic, and wax; and begs to observe, that the different persons to whom she has given the receipt, never failed in making the composition, *when they adhered strictly* to her directions. At her leisure, she used to mix the colours (in powder) with the cream, and when dry, took the lumps so prepared off the palette, and put them in papers, to keep them clean, and when either was required for use, she cut a piece off, and put it in a little fair water, and in a few minutes it became in a fit state to use, and Mrs. Hooker has now different colours so mixed as long ago as the year 1795, in the finest state possible for use, and neither (*even the flake white*) the least changed; it is a great advantage that there is no necessity for clearing the palette continually; an earthen palette is the most convenient. She prefers cutting off the quantity of each colour for immediate use, and diluting them as before explained, to letting them *remain* wet any considerable time, as that must weaken the gum Arabic, and thereby diminish what the Italians call the "*Impastura*."

Finding the colours dry too fast on the palette, I was much inconvenienced at first; but on reconsidering my instructions for using the paints (when mixed with the cream) *with fair water*, I diluted each colour (after preparing them with the cream) with as much fair water as would render them usable: this preserved them moist much longer than before; but still *they dry very inconveniently soon*, to a novice in the use of them; but this only proves the want of practice, both in the department of mixing and using the materials, and does not lessen my high opinion of Mrs. Hooker's discovery.

C. H.

The regular sizes of canvass, and their technical names, are as follow; for which the author is obliged to Mr. Brown,

Primed Cloth Manufacturer, and Colourman to Artists, 163, High Holborn.

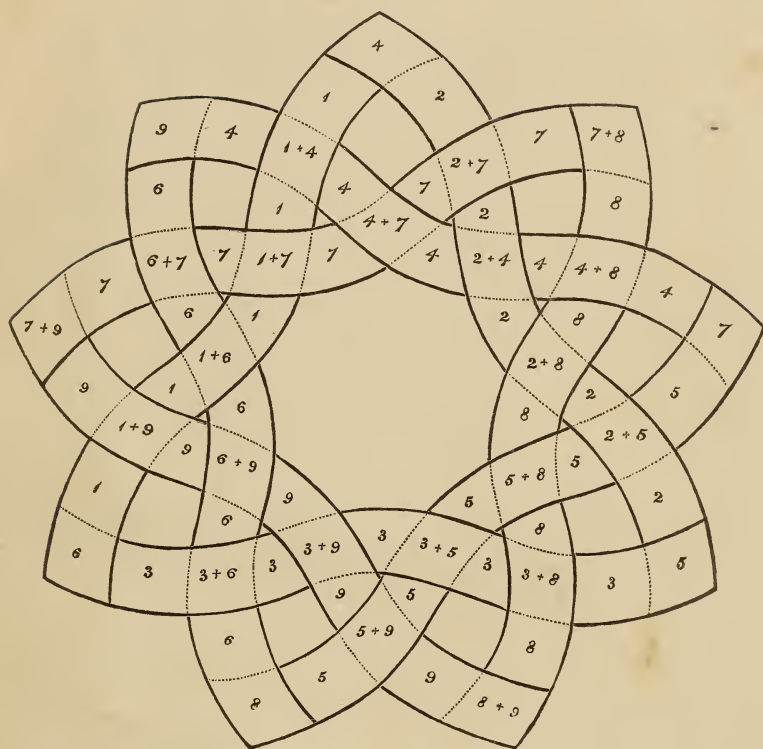
		<i>ft. in.</i>			<i>ft. in.</i>	
A whole length . . .	<i>measures</i>	7	10	long by	4	10 wide.
A bishop's half length	—	4	8	—	3	8
Common half length .	—	4	2	—	3	4
Small half length .	—	3	4	—	2	10½
Kitcat . . . . .	—	3	0	—	2	4
Three-quarter size .	—	2	6	—	2	1
Head size . . . . .	—	2	0	—	1	8
Two smaller sizes . .	—	{	1	0	—	1 5
			1	5½	—	1 2

Landscapes have no settled dimensions, but are often painted on the above given sizes, placing them on their sides instead of upright, as for portraits; thus, on asking the size of a landscape, a painter would answer, "It is a whole-length size, landscape way," which you are to understand to measure in length and width according to the measure given under the head "*whole length*."

#### SIZES OF DRAWING-PAPER.

	<i>Inches.</i>	
Demy . . . . .	20	by 15
Medium . . . . .	22	— 17
Royal . . . . .	24	— 19
Super Royal . . . . .	27	— 19
Imperial . . . . .	30	— 21
Columbia . . . . .	34	— 23
Atlas . . . . .	33	— 26
Double Elephant . . . . .	40	— 26
Antiquarian . . . . .	52	— 31
Extra large ditto . . . . .	56	— 38

## COMBINATION OF



## THE THREE PRIMITIVE COLOURS.

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THE multiplication of tints by various intersections may be made very instructive, as well as amusing. The foregoing contrivance exhibits the three Primitives and their six pure compounds, with twenty-one additional compounds by couplets.



The following List is intended to serve as a Key to the effect of the combination of the nine colours of the system in the diagram of the preceding page.

1 are Yellow	}	— { Primitive colours	2+5 are Red	and	Purple
2 „ Red			2+8 „ Red	„	Slate
3 „ Blue			3+6 „ Blue	„	Green
4 „ Orange	}	— { First compound	3+9 „ Blue	„	Olive
5 „ Purple			3+5 „ Blue	„	Purple
6 „ Green			3+8 „ Blue	„	Slate
7 „ Brown	}	— { Second compound	4+7 „ Orange	„	Brown
8 „ Slate			6+9 „ Green	„	Olive
9 „ Olive			4+8 „ Orange	„	Slate
1+4 „ Yellow	and	Orange	5+8 „ Purple	„	Slate
1+7 „ Yellow	„	Brown	5+9 „ Purple	„	Olive
1+6 „ Yellow	„	Green	6+7 „ Green	„	Brown
1+9 „ Yellow	„	Olive	7+8 „ Brown	„	Slate
2+7 „ Red	„	Brown	7+9 „ Brown	„	Olive
2+4 „ Red	„	Orange	8+9 „ Slate	„	Olive

Colour the sides of the triangles by the first nine numbers in rotation,—the couplets will then all answer to the names appropriated to them in the above list.





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